Scientific American.

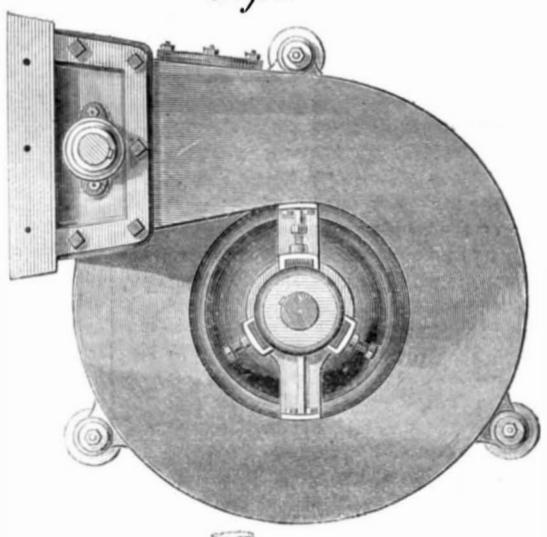
A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

Vol. XII.---No. 8. (NEW SERIES.) NEW YORK, FEBRUARY 18, 1865. $3 PER ANNUM (IN ADVANCE

Improved Helical Turbine.

The several engravings (Figs. 1, 2 and 3), published herewith, represent a turbine water wheel, combining the helical curve with the Jonval wheel proper, in a neat, compact and portable form. It can be set in the place of any common water wheel with the same expense of foundation, fluming, gearing, etc. The inventor's experience for the last twelve years in building the Jonval turbine, including his experiments at the Fairmount Water works, Philadelphia, in 1859 and 1860, where he obtained a result of 6½ per cent over all other competitors, has enabled him to produce a turbine which, for simplicity of construction, durability and power cannot be equaled.

Fig. 2



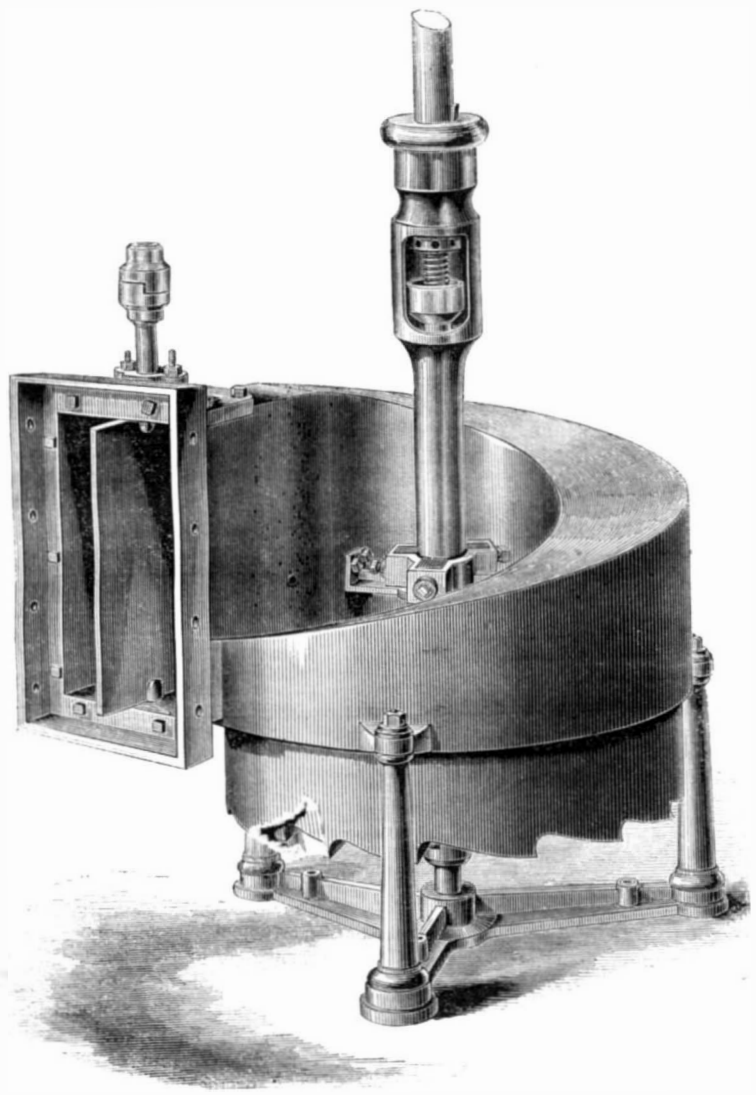
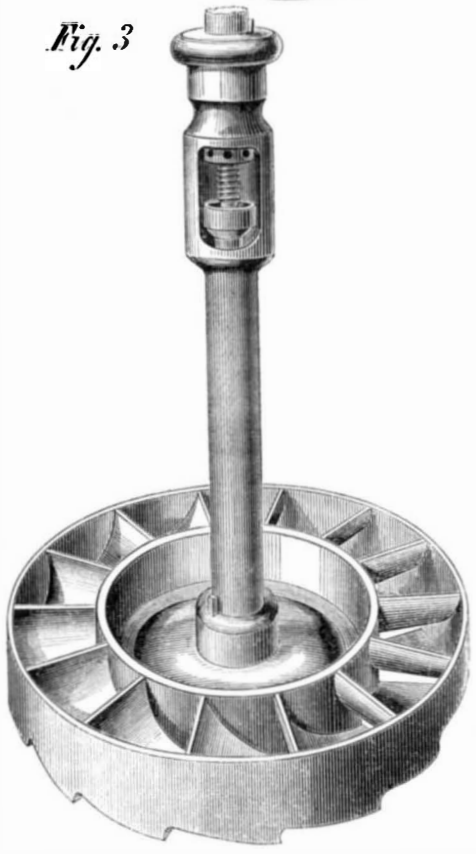


Fig. 3



STEVENSON'S HELICAL TURBINE.

Fig. 1 is a perspective view of the turbine complete. Fig. 2 is a plan or top view; and Fig. 3 is a view of the wheel and shaft.

The proportion of wheel, in the number of its buckets, form and size of its discharge openings, etc., are improvements which render it free from liability to clog up with anchor ice or any rubbish. The helix is so constructed that the velocity and force of the water acts upon all the buckets at once; the *vis viva* of the water is not lost by friction on the sides of the helix before acting on the wheel. The step is made of hardened steel and is of peculiar form; it is placed above the wheel, resting on a stationary spindle inside the hollow shaft which the wheel is keyed to, thus doing away with the large wooden step below the wheel, which causes a loss of power by friction. In the hollow shaft is an opening suitable for oiling and adjusting the step, and also for regulating the hight of the wheel to the helix by means of a screw and nut, so as to prevent loss of water from leakage. There can be no loss of power by the rubbing at the periphery of the wheel, caused by the lateral wear of the step, as in common scroll wheels after running a year or two. The power of the wheel can be perfectly regulated by the gate, and when machinery is thrown on and off, an ordinary governor will keep a uniform speed. These wheels are applicable to all mill powers, and can be furnished from twelve inches diameter up to seven or eight feet, in a reasonable time after the order is given. If properly put up and geared, 80 per cent of useful effect will be obtained; the experience of the last few years has fully warranted this assertion. For further information address J. E. Stevenson, Hydraulic Engineer, 200 Broadway, New York, upon whose improvements patents are now pending through the Scientific American Patent Agency.

On the occasion of the new year, the Emperor presented to the son of Prince Napoleon an automaton toy, representing a gardener with a barrow. The figure walks backwards and forwards, and turns its head in the most natural manner, at the same time wheeling before it whatever may be put in the barrow.

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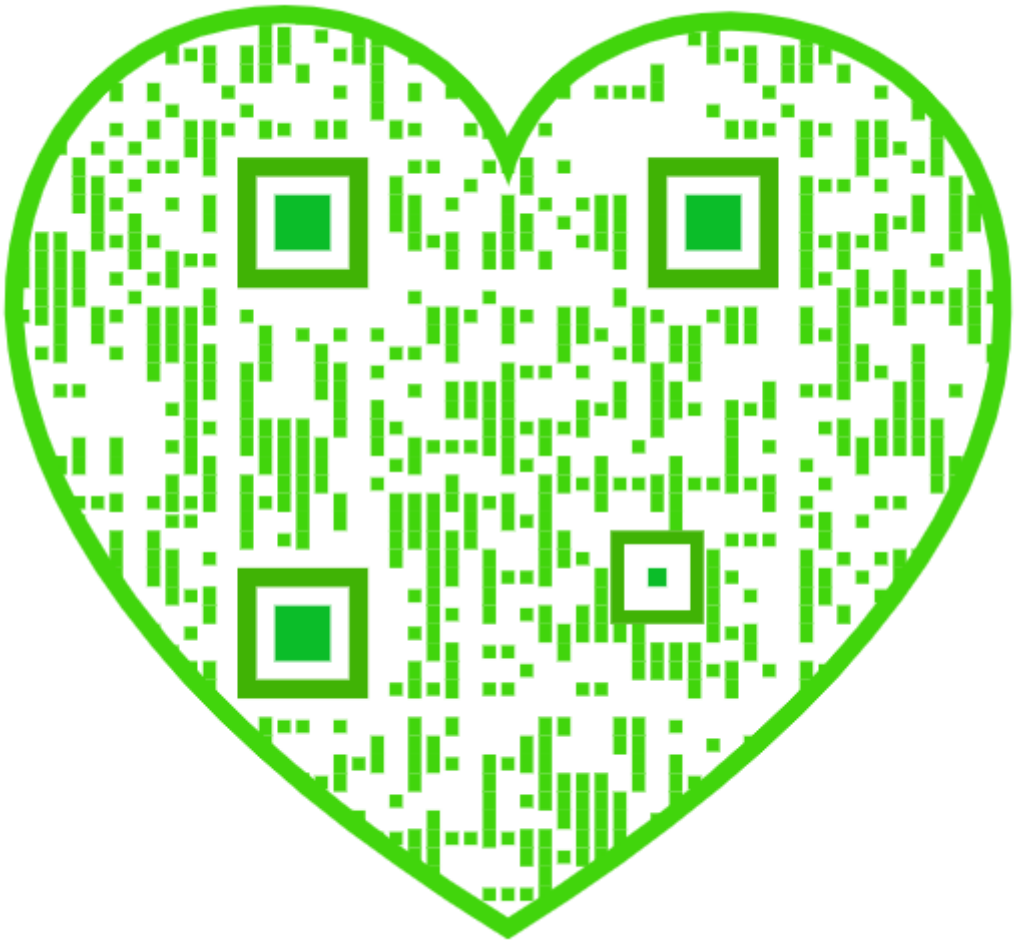

VISIT TO A PETROLEUM REFINERY.

THE GENERAL PROCESS.

Petroleum as it is raised from its caverns in the rocks is a dark and dirty liquid, so disagreeable in its appearance that for forty years after its existence in this country was known it failed to come into general use. But, fortunately, an easy and simple process of purifying it has been discovered, which leaves it the most transparent, beautiful and perfect of all illuminating materials. Petroleum is refined by first distilling it, then agitating it with sulphuric acid, then adding caustic soda to remove the acid, and finally washing the oil perfectly with water. Some refiners also use certain other chemical agents to more thoroughly bleach and deodorize the oil, and in consequence of these delicacies in the manipulations, there is a difference in the quality of the oil turned out by the various establishments, the product of some being so much clearer and purer that it sells in market at three or four cents per gallon more than others.

THE OLEOPHENE OIL WORKS.

The best quality in market is produced at the Oleophene Oil Works, situated at Hunter's Point, Long Island, opposite the upper portion of this city; this is also one of the largest refineries in the country. We recently had an opportunity of going over these works in company with Mr. Leserman, the manager, who explained to us the several operations.

SOME PROPERTIES OF PETROLEUM.

It is known that petroleum is composed of two elements, hydrogen and carbon. These two elements combine together chemically to form a large number of chemical compounds, which are mechanically mixed together to constitute petroleum. These hydro-carbons have one property in common, they are all combustible. But their other properties vary very widely; some are gases, others are liquids, and one at least is a solid almost as hard as lead. As the solids, and to some extent the gases, are soluble in the liquids, the whole mass is liquid. The volatility of the several hydro-carbons which constitute petroleum is the first property which is considered in the effort to separate them. An oil can be obtained which will boil at 90°, another which will boil at 91°, and another at 92°; even these are found, however, to be not single chemical compounds but several hydro carbons mechanically mingled. Their boiling points differ from each other by gradations so small that it is impossible to effect their separation by the process of fractional distillation or indeed by any other process yet known.

THE BOILERS.

The boilers are simple cylinders of wrought iron, five feet in diameter and ten feet in length, and holding fifty barrels each. They are set in brick work with furnaces under them for anthracite coal, and each is provided with a pipe from its upper part to lead the vapor to—

THE CONDENSERS.

These are worms of copper pipe set in tubs or vats of cold water. The pipe of each condenser is 100 feet in length and $2\frac{1}{2}$ inches in diameter at the larger end near the boiler. The vats are six feet in diameter and nine feet in hight, being of sufficient depth to allow three or four feet of water above the worm.

DISTILLING.

As petroleum, like most other substances expands by heat, care must be taken not to fill the boilers quite full. About 45 barrels are introduced into the boiler, and a bright fire is started in the furnace. The more volatile of the hydro-carbons are first evaporated, and as the vapor is driven into the coil of cold pipe it is condensed, and flows out at the lower end. Then follow the less volatile portions; and in the course of from 40 to 48 hours the whole charge is driven over with the exception of four or five per cent of the non-volatile matter, which remains in the form of a dirty tar. The fire is now drawn, and when the boiler is sufficiently cooled the workmen enter it through a man-hole provided for the purpose, and scrape out the residuum.

As the oil flows from the condenser it is divided into three portions for different uses. The lightest, that comes over first, is called gasolene. This cannot be used in lamps with safety, as it rises in vapor so freely that it mixes with the atmospheric air to form an explosive compound. It is employed to some extent for making an illuminating gas by mixing its vapor with air. Its specific gravity ranges from 80° to 90° of Beaume's scale.

The next that comes over, ranging from 60° to 80° is separated and sold under the name of benzine. This is used in mixing paints and varnishes, and for purposes generally for which camphene was formerly employed.

The last of the distillation, constituting the principal portion of the petroleum, is illuminating oil. This ranges in density from 35° to 60°. As the stream of oil flows out from the lower end of the condenser its color is a light, delicate blue. The tar is sold for making illuminating gas, and considerable quantities are sent to Europe, where it is said to be employed in manufacturing dyes.

THE AGITATORS.

The vessels in which the oil is treated with sulphuric acid are upright wooden casks some 8 feet in diameter and 9 or 10 feet in hight; they are lined with sheet lead, and provided in the interior with revolving fans which are driven by steam power. After being thoroughly mixed with sulphuric acid, caustic soda is added to remove the acid, and then the oil is thoroughly washed with water.

Nearly all the hydro-carbons of petroleum are neutral—neither acid nor alkaline—but a few have alkaline or basic properties, and it is from these that the crude oil derives its offensive odor. Sulphuric acid enters into combination with these basic oils, forming salts which can be completely removed by washing. The acid also oxydizes a portion of the heavier hydro-carbons, converting them into asphaltum, which settles out of the oil with the water.

The dimensions and materials of the boilers, condensers and other portions of the apparatus vary in different establishments, but those given here are considered the best by Mr. Leserman.

The washing is effected in the same vessels that are employed in treating the oil with sulphuric acid. The oil is pumped or drawn into the vessels, the sulphuric acid is added, the fans are set in motion till the liquids are thoroughly mixed, and then the oil is allowed to settle to the bottom of the cask. The bottom is of a conical form with a hole in the center closed by a stop cock. The oil and its compounds settle in a dark mass at the bottom, and then the stop cock is opened and this sediment is drawn off, the workman carefully watching the flow so as to stop it before any of the clear oil escapes. Next, soda is put into the cask, the agitators are driven awhile, the mass is allowed to settle, and the sediment is drawn off. Finally, water is pumped in with the oil, and the agitating, settling and drawing off process is repeated.

Physical Effects of Music.

Gottschalk contributes to the *Atlantic Monthly* some notes on music, from which we extract this paragraph:

"It communicates to the body shocks which agitate the members to their base. In churches the flame of the candle oscillates to the quake of the organ. A powerful orchestra near a sheet of water ruffles its surface. A learned traveller speaks of an iron ring which swings to and fro to the sound of the Tivoli Falls. In Switzerland I excited, at will, in a poor child afflicted with a frightful nervous malady, hysterical and cataleptic crises, by playing on the minor key of E flat. The celebrated Dr. Bertier asserts that the sound of a drum gives him the colic. Certain medical men state that the sound of the trumpet quickens the pulse and induces slight perspiration. The sound of the bassoon is cold; the notes of the French horn at a distance, and of the harp are voluptuous. The flute played softly in the middle register calms the nerves. The low notes of the piano frighten children. I once had a dog who would generally sleep on hearing music, but the moment I played in the minor key he would bark piteously. The dog of a celebrated singer whom I knew would moan bitterly, and give signs of violent suffering, the instant his mistress chanted a chromatic gamut. A certain chord produces on my own sense of hearing the same effect as the heliotrope on my sense of smell and the pineapple on my sense of taste. Rachel's voice delighted the ear by its ring before one had time to seize what was said, or appreciate the purity of her diction.

"We may affirm, then, that musical sound, rythmical or not, agitates the whole physical frame—quickens the pulse, incites perspiration, and produces a pleasant momentary irritation of the whole nervous system."

Corn Shellers Wanted.

A correspondent of the *Country Gentleman* says:—

"Living as I do, in the midst of a pretty extensive corn-growing country, in common with many others, I wish to obtain information as to the best hand power corn sheller in use. A good hand sheller is an implement much needed among farmers. Such a machine would meet with a ready sale in this section, if it could be found. What I regard as desirable qualities in such a machine are—1st. Rapidity of shelling—2d. Ease of execution—3d. Shelling clean—4th. Separating the cobs from the corn, depositing the cobs in one basket and the corn in another. Do you know of any machine superior to the old Clinton sheller?"

The editor of the journal says:—

"We do not know of a better hand sheller than the Clinton, although there are some others that we think quite as good. It needs careful experiment for a season or two, with the different kinds to enable one to say positively which is best. But we cannot strongly recommend any hand-sheller, unless it be to furnish an occasional grist for family use, a feeding for chickens, or a small quantity for planting. Now that labor is so high priced, and so many farmers are furnished with horse-power, a good horse-machine ought to be employed by every farmer who raises any considerable amount of corn. It hardly pays to consume the valuable time of laborers to shell corn at the rate of ten or fifteen bushels per day with hard work at that."

Mineral Lands.

A bill has been introduced into Congress in regard to the mineral lands. It provides for vesting the fee in individual proprietors by absolute sales, contemplates their survey and subdivision into small tracts, and fixes a minimum price upon them, graded according to size. locality and mineral value; prohibits combinations among bidders at the public sales, and the purchase of any lands by foreigners, except those who shall have declared their intention to become citizens; provides that actual discoverers and workers of mineral lands shall have the right to purchase at the minimum price; limits the quantity which any single purchaser may buy to forty acres; requires the gold and silver produced to be coined in the mints of the United States; empowers the President to lay off the mining regions into suitable coining districts, and compels miners to have their gold and silver coined in the districts in which they are extracted; provides that purchasers shall first take the oath of loyalty, and that the net proceeds of sales of these lands be applied to the payment of the United States bonds.

A Constant Battery.

A constant battery to be applied to the manufacture of magnesium is described by Arthur Reynolds in the *Chemical News*. It had occurred to him that a constant and cheap battery might be made by employing for an exciting liquid a solution of perchloride of iron, and for the metal to be attached, metallic iron, the copper-plate being replaced by carbon. The most convenient form of the battery would be to have pots made of carbon for holding the liquid. Slits cut in a thick plate of gas retort carbon would do. The action of the battery would be quite constant, as the exciting liquid would always remain in the same condition, the iron dissolving by reducing the solution to protochloride, which, being oxydized by the air, would be deposited, so that the solution would always remain of the same strength. This would be as cheap, or cheaper, than any other form of battery, and perpetually constant, and the same acid would do for a long time. The purpose for which he proposes to employ the battery is to the manufacture of magnesium from sea-water. The sea-water should be evaporated with a little chloride of calcium, and after the main bulk of the common salt and sulphate of lime has crystalized out, the solution should be evaporated to dryness, the dry mass melted, and decomposed by the voltaic battery before described.

The most Profitable Patent ever Obtained.

By an extract in another column it will be seen that the London *Engineer* states Bessemer's receipts from his patent for making steel, at $500,000 a year.

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IS THE BLOCKADE EFFECTIVE?

Facts are better than fancies, and statistics are more reliable than loose opinions from prejudiced sources. For years the enemies of the Government, and of the Navy Department in particular, have kept up a bitter tirade against it on account of its assumed want of care or watchfulness in blockading the Southern ports. Did a British vessel succeed in entering Charleston, vials of wrath and vituperation were poured out upon every one in the navy, from the Secretary down to the mess cook, and some papers were so unscrupulous as to assert that naval officers connived at the entrance of the blockade runners, being paid for so doing.

The London *Engineer* publishes a letter from its Liverpool correspondent showing the net results—profit and loss, as regards the number of ships built, captured and now running, which presents the subject of the efficiency of the blockade in a very different light from that in which it is exhibited by our own disloyal journals.

It appears that the whole number of vessels built from 1862 to 1864, was 111. The fate that befell them is thus stated:—Destroyed, 23; captured, 48; still running, 29; on the way out, 11. The "still running" list must be decreased somewhat, for the Liverpool correspondent was not aware that some half a dozen would be captured between the time of his letter and its reception in America. The cost of this fleet was $8,500,000, estimating the pound sterling at $5, net. Besides the men employed in the building and engineering of these vessels, there were 3,300 other men taken from the commerce of the Clyde. Of this vast fleet of blockade runners—far larger in fact than the steam navy of the United States before the war—one half has been captured, and nearly one-fourth destroyed, while the loss of men and money to the builders and owners has been very great. These unadorned facts are a sufficient answer to the oft-repeated statement that the blockade of the Southern coast has been defective.

WOOL FROM PINE TREES.

A correspondent has very kindly copied and sent to us an article from *Chamber's Journal*, of 1852, giving an account of a wonderful discovery by a German chemist of a chemical process for obtaining wool from the leaves of pine trees. The leaves are stripped from the trees by hand, and treated by the process, which results in dissolving the resinous portions and leaving the fibers separated in the form of "wood-wool." The article states:—

"It was found that, at the end of five years, a wood-wool mattress had cost less than one made of straw, as the latter requires an addition of two pounds of new straw every year. In comparison with horse-hair, it is three times cheaper; it is safe from the attack of moths, and in a finished sofa no upholsterer would be able to distinguish between wood wool and hair stuffing. It has been further ascertained that this wool can be spun and woven. The finest gives a thread similar to that of hemp, and quite as strong. When spun, woven and combed, a cloth is produced which has been used for carpets, horse-cloths, etc.; while mixed with canvas warp it will serve for quilts, instead of being employed in the form of wadding."

The whole article is a puff in the same strain, without any description of the process, the only thing that would be of any interest to either ourselves or our readers. We always distrust accounts of great results produced by secret processes, especially if they purport to have been discovered by an unknown chemist. When Bunsen, Kirchoff, Liebig, or any other great master of chemical science makes a discovery, he hastens to lay it before the world in all its minute details. If a German or other chemist offers to sell a secret process which will produce some wonderful results it is pretty safe to conclude that he is a charlatan and a swindler.

Report of the Ordnance Department on Stevenson's Turbine.

Wm. N. Jeffers, Inspector of Ordnance, in charge, says:—"After a sufficient trial I have to report that it is in every respect satisfactory, and performs all the work for which it was calculated. As a considerable portion of the power is required to drive the circular saw, which is intermittent in its action. I have found it convenient to apply a governor in order to keep up a uniform speed when all the lathes are not in action."

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Improved Press.—This invention consists in a press box, one side of which is made movable, so that the size of this box can be increased or decreased at pleasure. The movable side is fitted in suitable grooves, and it connects by ropes or chains with a windlass, in such a manner that by turning said windlass in one direction, the movable side is thrown open, and by turning it in the opposite direction, said side is closed up, and by the peculiar arrangement of the windlass and rollers, the chains are always kept taut. The follower is operated by two levers or lifters, the inner ends of which are hinged to the follower and connected by ropes or chains which extend over pulleys secured to the frame and thence down and under pulleys near the inner ends and over pulleys in the outer ends of said levers, and to a windlass or windlasses, in such a manner that, by the action of those branches of the ropes or chains, extending from the inner ends of the levers over the pulleys secured to the frame of the press, said levers are started from a horizontal position without requiring any attention from the operator. In order to take up the extra amount of chain, without embarrassing the operation of the press, the chains used for operating the levers and the follower extend over two drums, which are geared together, so that they rotate in opposite directions, and that the length of chain required to give the press sufficient power to do the work, can be taken up without difficulty. S. J. Austin, Freeport, Me., is the inventor.

Tobacco Paper.—This invention consists in coating or preparing thin sheets of fibrous material on one or both surfaces with fine particles of tobacco, thereby utilizing tobacco which is generally abandoned as "waste," or unfit for use, and thereby employing it for use in smoking after the manner of leaf tobacco.—H. J. Hale. No. 16 Beekman street, New York, is the inventor.

Improved Picker.—This invention consists in binding the wooden picker-cylinder of pickers for disintegrating fibrous materials by means of a strand or strands of wire or other equivalent means, so as to strengthen them, and make it possible to run them with safety at a greater speed than has been hitherto possible. Seth Boyden, Newark, N. J., is the inventor.

Carbureting Air.—This invention consists, principally, in carbureting air by confining or catching the carbonaceous matter which rises in the form of vapor from the hydro-carbon liquid during the natural process of evaporation. Mr. McAvoy's discovery obviates the necessity, heretofore existing, of employing the expensive and complicated apparatus which is commonly used to commingle the oil and air by forcing the latter through the former. Hugh L. McAvoy, of Baltimore, Md., is the inventor.

Canadian Patent Laws.

Hon. Mr. Perrault has introduced into the Legislative Assembly of Canada a bill to amend the Patent Laws so as to allow inventors of all other countries the privilege to take out patents in those Provinces. The bill, a copy of which is now before us, is quite liberal in its provisions, and we trust that it may become a law. When this is done, Canadians can take out patents here upon the same terms as citizens.

THE *Evening Post*, in a recent notice of Munn & Co.'s Patent Agency, says:—"These gentlemen are publishers of the SCIENTIFIC AMERICAN, in this city, and have had long experience in procuring patents for this and other countries. They possess unusual facilities, through their favorable connections in Washington, for securing patents without unnecessary delay, and, through their paper, for bringing the patents to public notice.

REGNAULT has in press a new work on vapors. This ought to settle all questions in relation to the heory at least of expansion.

SPECIAL NOTICES.

MILO PECK, of New Haven, Conn., has petitioned for the extension of a patent granted to him on the 25th day of November, 1851, for an improvement in drop presses.

Parties wishing to oppose the above extension must appear and show cause on the 30th day of October next, at 12 o'clock, M., when the petition will be heard.

J. C. DICKEY, of Saratoga Springs, N. Y., has petitioned for the extension of a patent granted to him on the 3d day of June, 1851, for an improvement in revolving frames for drying fruits and other articles.

Parties wishing to oppose the above extension must appear and show cause on the 15th day of May next, at 12 o'clock, M., when the petition will be heard.

RICHARD E. SCHROEDER, of Rochester, N. Y., has petitioned for the extension of a patent granted to him on the 6th day of May, 1851, for an improvement in limekilns.

HENRY B. GOODYEAR, of New Haven, Conn., administrator of the estate of Nelson Goodyear, deceased, has petitioned for the extension of a patent granted to the said Nelson Goodyear on the 6th day of May, 1851, and re-issued, No. 556, on the 18th day of May, 1858, for an improvement in the manufacture of india-rubber.

HENRY B. GOODYEAR, of New Haven, Conn., administrator of the estate of Nelson Goodyear, deceased, has petitioned for the extension of a patent granted to the said Nelson Goodyear on the 6th day of May, 1851, and re-issued, No. 557, on the 18th day of May, 1858, for an improvement in the manufacture of india-rubber.

Parties wishing to oppose the above extensions must appear and show cause on the 17th day of April, at 12 o'clock, M., when the petitions will be heard.

A CURIOUS trial took place in Paris this week on a vexed horticultural question. It was decided that cauliflowers are not simple cabbages. This point was determined in a case of a "Railway Company *v.* Importers of Salad." The plaintiffs pleaded that by reason of its head a cauliflower required especial care *in transitu*. The defendants set it up as a mere cabbage, treating the head as an accident requiring no special service. If the head was broken, the pieces could be picked up and rendered serviceable. The Court, however, held that your cauliflower was a delicate plant, and ruled that it was entitled to be placed with peas, and therefore a verdict was given in favor of the carriers.

BUTTER.—The amount of the butter crop of the United States is estimated at $65,000,000. The value of this article might be greatly enhanced by stricter attention to its manufacture. No product of the farm is so liable to depreciation as this.

It is said that at the present time, scarcely one firkin in four opens perfectly sweet. This deterioration arises not from any real chemical or practical difficulty, but solely from want of knowledge or want of care in making it.

NUMBER OF FIRE ENGINES IN NEW YORK CITY.—At a recent examination of the Chief Engineer of the Fire Department, in this city, it appeared that there are 125 engine, truck and hose carriages, some 30 tenders to engines, and a number of "crabs" or "jumpers," for use in bad weather. The Chief Engineer testified that the ordinary speed of the steam engines drawn by hand, on the Broadway pavement, was $7\frac{1}{2}$ miles per hour.

A French proprietor lately paid four millions of francs for a track of vine-land where Medoc was the favorite wine; and he has realized the full amount of the purchase money from the crop of 1864 alone. This result would almost satisfy an unsuccessful petroleum speculator.

IT was in 1846 that Faraday made the great discovery that all bodies are subject to the force of magnetism, some being drawn into positions parallel with the magnet, and others at right angles.

STEROXYLIN is the name of a substitute for glue used by paper manufacturers. It is said to be only soluble glass in a very concentrated condition.

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COUNT RUMFORD'S DISCOVER THAT HEAT IS MOTION.

Now that the mechanical theory of heat is being generally accepted by philosophers as an established truth of science, it is peculiarly interesting to recall the manner in which the idea was first suggested to the mind of our countryman, Count Rumford.

"It is described in a paper published in the transactions of the Royal Society for 1798. He was led to it while superintending the operations of the Munich arsenal, by observing the large amount of heat generated in boring brass cannon. Reflecting upon this, he proposed to himself the following questions:—'Whence comes the heat produced in the mechanical operations above mentioned?' 'Is it furnished by the metallic chips which are separated from the metal?'

"The common hypothesis affirmed that the heat produced had been latent in the metal, and had been forced out by *condensation* of the chips. But if this were the case the capacity for heat of the parts of metal so reduced to chips ought only to be changed, but the change undergone by them should be sufficiently great to account for *all* the heat produced. With a fine saw Rumford then cut away slices of unheated metal, and found that they had *exactly the same capacity for heat as the metallic chips.* No change in this respect had occurred, and it was thus conclusively proved that the heat generated could not have been held latent in the chips. Having settled this preliminary point, Rumford proceeds to his principal experiments.

"With the intuition of the true investigator, he remarks that 'very interesting philosophical experiments may often be made, almost without trouble or expense, by means of machinery contrived for mere mechanical purposes of the arts and manufactures.' Accordingly he mounted a metallic cylinder weighing 113.13 pounds avoirdupois, in a horizontal position. At one end there was a cavity three and a half inches in diameter, and into this was introduced a borer, a flat piece of hardened steel, four inches long, 0.63 inches thick, and nearly as wide as the cavity, the area of contact of the borer with the cylinder being two and a half inches. To measure the heat developed, a small round hole was bored in the cylinder near the bottom of the cavity, for the insertion of a small mercurial thermometer. The borer was pressed against the base of the cavity, with a force of 10,000 pounds, and the cylinder made to revolve by horse power at the rate of thirty-two times per minute. At the beginning of the experiment the temperature of the air in the shade and also in the cylinder was 60° F., at the end of thirty minutes, and after the cylinder had made 960 revolutions the temperature was found to be 130° F.

"Having taken away the borer, he found that 839 grains of metallic dust had been cut away. 'Is it possible,' he exclaims, 'that the very considerable quantity of heat produced in this experiment—a quantity which actually raised the temperature of upward of 113 pounds of gun metal at least 70°, could have been furnished by so inconsiderable a quantity of metallic dust, and this merely in consequence of a change in the capacity for heat?'

"To measure more precisely the heat produced, he next surrounded his cylinder by an oblong wooden box in such a manner that it could turn water-tight in the center of the box, while the borer was pressed against the bottom. The box was filled with water until the entire cylinder was covered, and the apparatus was set in action. The temperature of the water on commencing was 60°. He remarks, 'The result of this beautiful experiment was very striking, and the pleasure it afforded amply repaid me for all the trouble I had taken in contriving and arranging the complicated machinery used in making it. The cylinder had been in motion but a short time when I perceived, by putting my hand into the water and touching the outside of the cylinder, that heat was generated.'

"As the work continued the temperature gradually rose; at two hours and twenty minutes from the beginning of the operation, the water was at 200°, and in ten minutes more it actually boiled! Upon this result Rumford observes, 'It would be difficult to describe the surprise and astonishment expressed in the countenance of the bystanders, on seeing so large a quantity of water heated and actually made to boil without any fire. Though there was nothing that could be considered very surprising in this matter, yet I acknowledge fairly that it afforded me a degree of childish pleasure which, were I ambitious of the reputation of a grave philosopher, I ought most certainly rather to hide than to discover.'

"Rumford estimated the total heat generated as sufficient to raise 26.58 pounds of ice-cold water 180° or to its boiling point; and he adds, 'from the results of these computations, it appears that the quantity of heat produced equally or in a continuous stream, if I may use the expression, by the friction of the blunt steel borer against the bottom of the hollow metallic cylinder, was *greater* than that produced in the combustion of nine wax candles, each three-quarters of an inch in diameter, all burning together with clear, bright flames.'

"One horse would have been equal to the work performed, though two were actually employed. Heat may thus be produced merely by the strength of a horse, and in a case of necessity this might be used in cooking victuals. But no circumstances could be imagined in which this method of producing heat could be advantageous, for more heat might be obtained by using the fodder necessary for the support of the horse, as fuel.

"By meditating on the results of all these experiments, we are naturally brought to that great question which has so often been the subject of speculation among philosophers, namely, What is heat? Is there such a thing as an igneous fluid? Is there any thing that with propriety can be called caloric?

"We have seen that a very considerable quantity of heat may be excited by the friction of two metallic surfaces, and given off in a constant stream or flux *in all directions*, without interruption or intermission, and without any signs of *diminution* or *exhaustion.* In reasoning on this subject we must not forget *that most remarkable circumstance*, that the source of the heat generated by friction in these experiments appeared evidently to be *inexhaustible.* (The italics are Rumford's.) It is hardly necessary to add, that any thing which any *insulated* body or system of bodies can continue to furnish *without limitation*, cannot possibly be a *material substance*, and it appears to me to be extremely difficult, if not quite impossible, to form any distinct idea of anything capable of being excited and communicated in those experiments, except it be MOTION."

REMARKS ON THE SUBJECT OF FORCE IN GENERAL.

BY JOHN A. ROEBLING.

[For the Scientific American.]

The subject of Force is now engrossing the attention of scientific men. In the early part of this century the conclusion was arrived at from general reasoning, that all forces in nature spring from one common source, and that correlations exist between the various phenomena which accompany the evolutions of nature's display. Since the year 1842, the publications and experiments of Mayer, Joule, Grove and others have thrown a flood of light upon the nature of force, and the earliest enunciations of the philosophical spirit of this century bid fair to be fulfilled to the letter. The most important truths which may be deduced from the facts but recently demonstrated experimentally, may be stated in general terms as follows:—

1. Force is matter in motion.

2. Matter is an incorporation of force, consequently also of motion.

3. The quantity or mass of matter which constitutes our Earth and atmosphere, is a fixed, invariable quantity. So is the aggregate mass which composes our planetary system. The same is true of each planetary system, and equally true of the whole material Universe. This broad statement may be objected to on the ground that new comets are being formed, that old ones are growing larger, and that meteors are being constantly made and dissolved within our cosmic region and outside of it. The answer is that all these processes take place *within* the realm of material creation and not *outside* of it. If a new comet is formed, it is out of that cosmical matter which constitutes the material universe. And if a comet becomes extinct, its nucleus by that process is simply resolving itself (from some unknown cause) into the original elements of space. The great fact impresses itself upon the human mind that the material creation is a fixed, and, for the time being (but not eternally), an unalterable quantity.

4. The material composing the universe being a constant quantity, and matter being equivalent to force, it follows that the forces of nature, in the aggregate, also form a constant and invariable quantity.

5. From the foregoing, it is evident that no additional forces, no new forces, can be created; neither can the general storehouse of forces, or of matter, be diminished.

6. There is neither creation, in the common sense, nor annihilation, and never has been. There certainly was a beginning, because processes cannot be *eternal* in duration, but they may last an *infinite* period of time. The word *Beginning* must be understood in an ideal or heuristic sense. All material existence constitutes a material process; all processes are governed by an inner unseen cause, and this cause, when traced to its final cause, will be discovered to be totally independent of time and space. To further elucidate this proposition would be out of place in this essay.

7. Since natural existence is only a process, in which a certain invariable quantity of matter or force is employed by the Creator for a certain well defined and well understood purpose, viz: the evolution and growth of rational and sentient beings—the conclusion logically presents itself that all changes and phenomena which are observed in nature are only phases of this process, passing away more or less rapidly. Whether this process involves the gradual evolution of elementary matter out of a chaotic condition, consuming millions of ages for its accomplishment, or whether it is a perpetual, never-ceasing action, as, for instance, the evolution of light and heat by the sun, and the consequent enormous evaporation of the ocean, and accompanying generation of electric and magnetic forces—it makes no difference, because time in the economy of nature is of no account.

8. All phenomena are more or less remote effects of the universal process; on this earth, as well as in our whole planetary system, and equally so in the whole realm of creation. The creative process, which maintains the life of the universe at large, is progressing uninterruptedly, without cessation. To arrest this vast process one single second of time would be annihilation. The pulsation of Universal Causality, which supports the life of the whole, is vibrating through every part, and in perfect accord and unison with that Great Central Mind and Heart which is the final cause of all.

9. Light being the most subtle and also the most universal force known and observed in nature, it may be inferred *a priori* that all other planetary forces either have grown out of it or refer to it, being more or less governed by it. The facts discovered of late years appear to favor the truth of this inference; but long years may pass away before it may become a scientific and experimental demonstration.

10. Heat is a less subtle agency, and admits of more tangible and conclusive experiments. Heat is a centroperipheric force, acting spirally, either expanding or contracting matter in its endeavors to equilibrate with the surrounding temperature.

11. It was stated that *force* is *matter in motion*, and that matter is incorporated force or motion. So long as two contiguous particles or molecules of the same kind of matter are in a quiescent state, or in equilibrium in a dynamical sense, so long will they both remain at rest with reference to each other. But should the thermal, electrical, magnetical, or chemical condition of the one molecule be disturbed, then the equilibrium will cease, and a display of force will result, which display is simply an endeavor to restore the lost equilibrium. If one molecule is set in motion, its condition opposite the other molecule is changed, and the consequence will be that this neighboring molecule is affected in the same way. And so the disturbance will proceed from one molecule to the other, until the whole mass is *uniformly* affected either by heat, electricity, or other kind of energy.

12. In the above phenomena no new evolution of

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force, no new creation, takes place; only a communication of disturbed condition from one molecule to another is transpiring, and this process continues until an equilibrium between all the molecules is obtained. All particles of matter are subject to natural affections, or to the energies which nature employs in her processes. The single molecules will remain at rest toward each other so long as they are equally affected or in an equally sensitive condition. But as soon as their affections differ in degree, then a more or less violent endeavor takes place to restore their former equality. The principles of nature are essentially democratic and founded on even justice.

13. All exhibitions of force result from a disturbance of equilibrium. This is equally true in a cosmical as it is in a terrestrial sense. The equilibrium of the universe is preserved by the constant tendency of gravitation to correct regular and irregular perturbations, and thus to maintain, not the equilibrium which attends rest, but which is the result of well-balanced motion. Nature knows no absolute rest—motion is universal. Where rest appears, it is only comparative. The motion of our planet and its life is supported by the light of the sun, which is a never-failing source of energy. Without the sun's influence, the play of all other energies would cease—stagnation and death would result. Owing to that constant flow of energy which is poured upon the planets by the central luminary, their molecular equilibrium is kept uninterruptedly disturbed. Not only is the earth's individual rotation maintained, but it is driven around the luminar center of gravitation, thereby proving that its center of life is not within itself, but outside of it. And by the same energy all minor planetary processes are sustained, more or less remotely, because they are all effects of the central cause.

14. The sun, by virtue of its greater mass, is positive opposite the planet, which, as the lesser quantity, is negative. And since matter is equivalent to force, the sun represents an overwhelming energy compared to the planetary energies. This immense difference constitutes a never-failing source of disturbance to planetary rest. In their mutual endeavor to restore rest and equilibrium, the sun is kept revolving around itself, and the planets are driven on in their swift race; and since equilibrium of rest can never be restored, an equilibrium of endless motion is the result.

15. Force is matter in motion. Mechanical motion proceeds from an outer cause, and is only communicated outwardly—that is, mechanically. If an iron ball is set in motion by powder, that motion is simply communicated or imparted by the expansive force of the gases which have been dynamically evolved by the process of combustion. That dynamical process was initiated by a match or by friction or percussion. The powder explosion takes place because of the disturbed equilibrium of the particles of powder. In a steam engine the elastic power of steam acts upon the piston, and its motion is communicated to various kinds of machinery. The dynamical motion is converted into mechanical motion, and the latter again expends itself in friction, and friction again produces heat and electricity. It does not matter how a force is produced or started, none can ever be lost. When a force is expended apparently, it has only been communicated to some neighboring matter, or has been converted into some other mode of motion. Nor can a new force be produced by any process whatever. When a weight falls ten feet, it has thereby produced a certain amount of mechanical action. But to restore the previous condition of things, the weight has to be raised again to the point of starting, and the same amount of force is expended. When steam is raised as a motive power, it is done through the agency of heat. But heat is the result of a chemical process by which no atom is destroyed; only old combinations are destroyed and new ones are formed. Now this process of combustion is attended by the phenomena of heat, and this heat is converted into mechanical action, and at last back again into heat and electricity. The heat which raised the steam was evolved by that oxydizing process in which carbon and oxygen unite and form carbonic acid. The principle of heat manifests itself through the vehicle of matter, its combinations and decompositions. The principle is universal and invariable. Matter is subject to certain mathematical evolutions, governed by certain laws on mathematical formulas, and these formulas have materialized and expressed themselves in certain fixed motions or modes of action, and these modes are known as heat, light, electricity, magnetism, etc. Now since these material actions of well-defined mathematical principles can only take place by means of matter which is constituted accordingly, and to suit the action, or whose consolidation is fixed by that very action of the spiritual or scientific principle, it follows as a matter of course that the quantity of existing forces is just as invariable as is matter itself.

[To be Continued.]

MR. MUSHET AND THE BESSEMER PROCESS.

Wrought iron is the pure metal, cast iron contains 2 to 4 per cent of carbon, and steel from $\frac{3}{4}$ to $1\frac{3}{4}$ per cent of carbon. Wrought iron is made by laboriously extracting the carbon from cast iron, and steel is made by restoring a portion of the carbon to wrought iron.

Bessemer's first plan was to remove just enough of the carbon from cast iron to leave it in the state of steel, and thus avoid the round about process of changing the metal first to wrought iron. It is well known that if carbon at a high temperature is brought into contact with free oxygen, the two elements combine to form either carbonic oxide or carbonic acid, and that both of these substances are gases. As one-fifth of the atmospheric air is free oxygen, Bessemer conceived the simple plan of blowing atmospheric air through molten cast iron, to burn out a portion of the carbon contained in the iron.

Mr. Bessemer, on trying his plan, found that it was exceedingly difficult to stop the combustion of the carbon at just the point to leave the metal in a state of steel, and the method now adopted is to continue the operation until the carbon is wholly consumed, and the molten cast iron is added to this wrought iron in such proportion that the mixture will contain the requisite quantity of carbon to form steel.

But there is difficulty in stopping even at the point where the carbon is all consumed. Oxygen has a very strong affinity for iron, especially when the iron is heated, and if on entering the mass it finds no carbon with which to combine, it enters into combination with the iron, forming oxide of iron. Oxide of iron is a brittle substance, and if it is scattered through a mass of iron it destroys the tenacity and value of the metal. It is manifest that the combination of oxygen with the iron is almost certain to commence before the whole of the carbon is consumed, as an atom of oxygen entering the molten mass might meet with an atom of iron before it encountered the last atom of carbon.

This fatal difficulty in the process was effectually overcome by a suggestion of Mr. Mushet, a suggestion which has made the Bessemer process a practical industry. The last number of the *London Engineer*, in a leading editorial on the subject, says:—

"Oxygen, in combining with carbon, produces a gaseous compound, only one-half heavier then air itself; and hence this compound must, of necessity, rise to the surface. But in combining with iron oxygen forms a heavy metallic compound, which is quite as likely to remain secreted in the pores of the melted mass as to float—for in no case can it escape into the air. That this compound is not formed from the first application of the blast is more than probable, because when, by a lucky hit decarburization has been stopped at the right point for steel, the product is much less red short than when the process is continued until all the carbon is exhausted. But however this may be, the danger of burning the iron before it is fully converted remains as distinctly as ever. Mr. Mushet saw it with the eye of a practised metallurgist, and almost as soon as he could have known of Mr. Bessemer's discovery, to wit, in September, 1856, he patented the remedy. His reasoning was rapid and conclusive. There was the oxygen secreted in the iron, and it must be got out. How? By presenting to it a metal more oxidizable than iron—a metal whose own affinity for oxygen would de-oxydize the iron. Such a metal is manganese; and the best vehicle for manganese, in this case, is spathic iron, or spiegeleisen. The best proof of the value of this addition is the fact that it was only after it was made that Bessemer metal took a recognized position in the market.

"Strangely enough, a discovery at once so important has brought no rewards to its author. Mr. Mushet's affairs were in the hands of trustees, and in 1859, three years after the reading of Mr. Bessemer's memorable paper at the Cheltenham meeting of the British Association, his process was looked upon as so hopelessly worthless that his trustees would not pay the £50 stamp to keep alive the patent for a discovery upon which the present value of the Bessemer process mainly depends. So it lapsed, and Mr. Bessemer lost no time in turning his opportunity to account, and how well he has done so is proved by the fact, which he takes no pains to conceal, that his present income from royalties exceeds £100,000 per annum! His royalties are £1 per ton for ingots for rails, £2 a ton for ingots for axles, &c., and £3 per ton for ingots for a higher quality of steel; and these are strictlyenforced against the largest concerns in the land. Even the London and North-Western Railway Company obtain no discount, and if the Ebbw Vale Company have done so it has been in the form of a sale of Martien's curious patent to Mr. Bessemer for £30,000—Martien having parted with it for £500."

Mechanical Progress.

Under this head the Hartford *Daily Post* pays the following compliment to the SCIENTIFIC AMERICAN:—

"We cannot do a greater service to machinists than to call their attention to a series of illustrated articles on 'Turning Tools' just published in the SCIENTIFIC AMERICAN. They are evidently from the pen of a practical workman, and are invaluable, not only for the accurate illustration, but for truly practical suggestions they contain. Probably on no one thing are machinists so disagreeing as on the proper shape of turning tools, and the proper use to which the varying kinds are applied. Some seldom use a 'bossing' or 'diamond point,' roughing off the work with a 'side tool.' It is an expensive and awkward use of a tool intended and adapted mainly to 'squaring up.' But in grinding tools the master mechanic submits to many annoyances in consequence of the shiftless habit of men who satisfy themselves with touching the point or cutting edge alone upon the stone. By a little care and time spent in properly grinding a tool, much labor is saved the forger, and a tool can be used up to the stock and still kept in shape without once dressing if managed with some degree of care and intelligence. A 'side tool' after being once finished should never be ground on the vertical cutting face. The top and edges alone should be ground and the latter more than the former. Many workmen grind the cutting point of a diamond tool until the back angles are much the highest and then the tool 'gnaws' the work instead of cutting it. A slight rounding of the cutting angle or face of the 'diamond point' will ensure smoother work and retain the edge much longer than where the corner is left a perfect angle. In finishing a shaft for a fit, or for a bearing, the slovenly habit of using the file ought to be entirely abandoned. A water polish with a 'square nosed' tool insures perfect rotundity and gives a better surface than the file and emery can. No more should be removed by this finishing cut than will just obliterate the marks of the bossing tool and leave a good surface. In the article referred to in the SCIENTIFIC AMERICAN the writer approves of the use of 'swan neck or spring tools.' We think their use of doubtful utility. No dependence can be placed upon securing perfect roundness or truth unless the material turned is perfectly homogeneous, a condition which the best iron, and even steel, will rarely fulfill. Instead of allowing for springiness in either the work or the tool, we believe that absolute stiffness and rigidity are indispensable to making a good job. Another bad habit among careless workmen is the use of turning tools indiscriminately on the lathe and the planer. While turning tools must have considerable 'rake,' the planer tools are forged nearly at right angles with the stock."

[By referring to page 34, current volume of the SCIENTIFIC AMERICAN, our readers will see precisely what we said about the use of spring tools.—EDS.

THE King of Siam, whose full name is "Phra Bart Somdetch Phra Paramenpe Maha Monghui Phra Chaum Kiow Chow Yu Hua," recently celebrated his sixtieth birthday, the ceremonies being of the most gorgeous character.

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Correspondence

Dental Plates.

MESSRS. EDITORS:—You will confer a favor on the public if you will say what description of dental plate—sets of teeth—is most durable and least injurious to health.

I have used teeth set in gold for several years, and the set for the lower jaw was covered with tin to make it heavy. The plate for the upper jaw broke several times, but was mended again, but I am afraid with an impure metal, judging from the galvanic action in the mouth from which I suffer so constantly.

My health has been giving way for many months past, and recently an idea has possessed me that the cause is the slow imbibing of a metallic poison. Will you enlighten me a little on this subject?

American Telegraph Co., Jan. 25, 1865. S. H.

[The salts of all metals, with the single exception of iron, we believe, are poisonous, and all metallic poisons have the insidious property of accumulating in the system. If two metals are placed in contact, the effect is to protect the less oxidizable metal completely from rust, and to increase the action upon the other. We should suppose that dental plates ought to be made of a single metal, and one having but slight affinity for oxygen—the best being gold.—EDS.

Paper from Cane, Hemp Stalks, Wood, Etc.

MESSRS. EDITORS:—In your issue of January 28, 1865, a letter from Mr. F. H. Sellers is published which contains some statements in relation to the disintegrating process by which Mr. Lyman obtained a patent some years ago. Mr. Sellers says that he and his father having obtained a license to use the Lyman process tried it upon cane in July, 1863, at Seller's Landing, in Hardin County, Ill., found it dangerous and costly, and that "the disintegration was not into ultimate fibers, but into long bundles of fibers, which, to separate, had to be treated with caustic alkali, under pressure, precisely as straw is treated, and then again blown through a small opening by steam power."

Mr. Sellers does not mention the fact that the license which his father obtained to use Lyman's process was dated April 12, 1862, and required him to have the guns in full operation within nine months from that date; and that he having failed to fulfill that condition received notice in February, 1863, that the license was forfeited, and that he would be sued as an infringer if he used the process.

Mr. Sellers, in his published letter before referred to, says that he did not use the process after that date, viz: in July, 1863, and was quite dissatisfied with it. Be that as it may, it is very certain that he could not use the guns if he had desired to do so. The Fiber Disintegrating Company, having become the owners of Lyman's patent, purchased from Mr. Sellers the two guns which he set up upon his farm in Illinois, and have lately ordered them to be removed to the works of the company, in the vicinity of St. Louis, where they intend to prepare cane, flax and hemp stalks for paper stock and textile material. Mr. Sellers, it appears, intends to prepare cane for paper stock by some process of his own, and has availed himself of your columns to show the superiority of his invention. It seems to be very probable that the use of the guns was dangerous to his farm hands; but, the fact is, that there is no danger in the use of them as they are now constructed when in the hands of competent persons. They are constructed to bear a pressure of over 1,000 pounds to the inch, whereas the pressure used is less than 200. They are supplied with steam from the Harrison or Bulb boiler, which is safe at 1,000 pounds pressure. What boilers Mr. Sellers had upon his farm I cannot say, but it is certain that he had no boilers of this construction. With respect to the cost of working the guns, and their capacity, I would observe that four guns of fifteen inches diameter, which have within the last few days been sent to the company's works, at St. Louis, have capacity sufficient to disintegrate over fifty tuns a day, at a cost of less than $2 a tun. It is true that "the disintegration is not into ultimate fibers, but into long bundles of fibers;" but then these long bundles of fibers are much more easily treated with chemicals than the raw cane could be. When they are boiled an hour or less in an open vessel, in a weak chemical solution, and then washed, they become good pulp. But Mr. Sellers tells us that by "a system of sap volatilization" he dispenses with the use of chemicals, and is able to produce what you call "a very fine article of wrapping paper" from three-fifths cane and two-fifths of some other material. What that "other material" is, is not stated. By the Lyman process a very fine white printing paper is produced from the cane alone, but not without the use of chemicals. Great improvements have been made in the construction and use of the guns and in the process subsequent to the blowing, and very large works have been erected during the past year in Brooklyn, where the company expect to make at least twenty tuns of paper pulp daily. The blowing process will also be applied in the West to tangled unretted flax straw and to green hemp stalks to produce textile material.

WM. P. ARNOLD,
Secretary of the Fiber Disintegrating Company, No. 29 Broadway, N. Y.—January 30, 1865.

Careless Handling of Fire-arms.

MESSRS. EDITORS:—Since the St. Alban's raid several persons in this vicinity have procured revolvers, and several serious accidents have occurred from the imprudent use of them—generally by persons foolishly pointing them at others, not thinking they were loaded. Now my opinion is that a person who will point a pistol at another, whether it is loaded or not—yes, a person that will even point a broom-handle, in imitation of a rifle, at any one—is not only a good candidate for an asylum of idiots, but is deserving of rough horse-whipping. I would like very much to have your opinion given in the columns of the widely circulated SCIENTIFIC AMERICAN.

Bristol, Vt., Feb. 3, 1865. E. G. P.

[One of our playmates once pointed a gun directly at the head of his younger brother, and pulled the trigger, supposing of course that the gun was unloaded. It was in the old days of flint locks, and as he turned back the hammer, to his horror he saw that the pan was filled with powder. On trying the gun again at a robin, it was discharged, and the bird fell dead at his feet. The first time the gun accidentally missed fire, and by this chance only was he spared from blowing his brother's head to pieces. We believe that by far the largest portion of accidents with firearms occur from handling them carelessly when they are supposed to be unloaded.—EDS.

Pyroligneous Acid in Chimneys.

MESSRS. EDITORS:—Our stove stands twelve feet from the chimney, which is twenty-five feet high; flue 4 inches by 12 inches, open top. Moisture condenses and runs down the chimney. If you know any remedy other than placing the stove nearer the chimney, will you be kind enough to indicate it? Stewart stove and dry wood are used.

Racine, Wis., Jan. 26, 1865. D. W. E.

[This moisture is doubtless pyroligneous acid and water. If the action continue long enough, our correspondent will find that the acid will dissolve the lime in the mortar, and the bricks in his chimney will be as loose as if they were laid in dry sand. His stovepipe will also be corroded. We know of no remedy.—EDS.

The Two Wheels.

MESSRS EDITORS:—In answer to "A Mechanical Problem," in a late number of your paper, I would say that the statement of the question is incorrect.

Two wheels composed of materials of different specific gravities cannot have "precisely the same size, weight and form," and at the same time have the materials differently disposed with relation to each other. If the iron at the rim of the one be placed at the center of the other the two wheels may have the same weight and form but not the same size—or the same weight and size but not the same form. The problem is fallacious. J. J. DUNLAP.

Springfield, Ohio, Feb. 9, 1865.

[Suppose you make two wooden wheels weighing one pound each, and of the same size and form; then turn a groove in the periphery of one, just large enough to take a ring of iron weighing one fourth of a pound, and bore a hole in the center of the other of just the size to receive a cylinder of iron weighing one fourth of a pound?—EDS.

Drilling and Turning Glass.

Glass may be readily drilled by using a steel drill, hardened but not drawn at all, wet with spirits of turpentine. Run the drill fast and feed light. Grind the drill with a long point, and plenty of clearance, and no difficulty will be experienced. The operation will be more speedy if the turpentine be saturated with camphor gum. With a hard tool thus lubricated glass can be drilled with small holes, say up to three-sixteenths, about as rapidly as cast steel. A breast or row drill may be used, care being taken to hold the stock steady, so as not to break the drill. To file glass, take a 12 inch mill file, single cut, and wet it with the above mentioned solution, turpentine saturated with camphor, and the work can be shaped as easily, and almost as fast as if the material were brass.

To turn glass in a lathe, put a file in the tool stock and wet with turpentine and camphor as before. To square up glass tubes, put them on a hard wood mandrel, made by driving an iron rod with centers through a block of cherry, chestnut or soft maple, and use the flat of a single cut file in the tool post, wet as before. Run slow. Large holes may be rapidly cut by a tube-shaped steel tool, cut like a file on the angular surface, or with fine teeth after the manner of a rose-bit—great care being necessary, of course, to back up the glass fairly with lead plates or otherwise to prevent breakage from unequal pressure. This tool does not require an extremely fast motion. Lubricate as before. Neat jobs of boring and fitting in glass may be made by these simple means. I have endeavored to turn glass rods with diamond pointed steel tools, etc., but without success. The whole secret lies in good high steel, worked low, tempered high, and wet with turpentine standing on gum camphor.

Baron Liebig's "Soup for Children."

With that remarkable estimation of the greatness of small things which is the most valuable of his many high intellectual qualities, and with a tender appreciation of the importance of small people, Baron Liebig devotes a special article in an English scientific periodical to the description of a new diet which he conceives to be the most fitting substitute for the natural nutriment of children robbed of their mother's milk. It is well known the cow's milk does not adequately represent the milk of a healthy woman, and when wheaten flour is added, as it commonly is, Liebig points out that, although that starch be not unfitting for the nourishment of infants, the change of it into sugar in the stomach during digestion imposes an unnecessary labour on the organization, which will be spared it if the starch be changed into the soluble forms of sugar and dextrine. This he effects by adding to the wheaten flour a certain quantity of malt. As wheaten flour and malt flour contain less alkali than woman's milk he supplies this when preparing the soup. This soup may be shortly prepared, as follows:—"Halt an ounce of wheaten flour and an equal quantity of malt flour; seven grains and a quarter of bicarbonate of potash and one ounce of water are to be well mixed; five ounces of cow's milk are then to be added, and the whole put on a gentle fire; when the mixture begins to thicken it is removed from the fire, stirred during five minutes, heated and stirred again till it becomes fluid, and finally made to boil. After the separation of the bran by a sieve it is ready for use. By boiling it for a few minutes it loses all taste of the flour." The immediate inducement for Baron Liebig making this soup arose from the fact that one of his grandchildren could not be suckled by its mother, and that another required, besides his mother's milk, a more concentrated food. The soup proved an excellent food—the children thrived on it. Baron Liebig has himself used this soup with tea as a breakfast, and a most thoroughly nutritious meal it must be.

FROM the experiments of Regnault, it appears that the sum of the latent and sensible heat of steam increases with the temperature by a constant difference of 0·305 for each degree Fahrenheit.

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The Bursting of the Parrott Guns---Report of the Naval Committee.

The *Army and Navy Journal* contains the elaborate report of the naval committee appointed to consider and report on the subject of rifle cannon for the navy. The report is dated Washington. January 18, 1865. The committee find that seven hundred and three Parrott guns of all callbers have been issued to the naval service, and that of these twenty-one have burst or been otherwise injured by explosion. Several of the injuries have appeared in fracture or rents, enabling the withdrawal of the guns form service in time to avoid casualties, and many of them have occurred in the chase or at the muzzle, and not, as is customary with other guns, at the breech; thus affording evidence that they arose from the premature explosion of shells within the guns—a fact which is proved by the direct testimony of several officers in charge at the time. That these guns have in some instances been injured by other causes than the premature explosions of shells, such as the use of compressed powder, projectiles deemed by Mr Parrott unsuitable for guns of his construction, by keeping guns loaded for a great length of time, and also by the neglect in heat of battle to lubricate the projectiles as required by the ordnance instructions—a most necessary and important precaution, having for its object not only the free movement of the projectile, put particularly as a means of neutralizing the tenacious deposit from the powder—which is admitted in some cases to have been done there seems little doubt; but they are exceptional cases. The committee, however, recommend that as the premature explosion of shells is one, and, in their opinion, the principal cause of the failure of the Parrott guns, experiments should be conducted at Cold Spring, or elsewhere, to place the question of this cause of bursting beyond dispute, and to decide whether it may be abated or not. With this view, the committee give directions as to the manner in which the experiments should be conducted. The result of these experiments will decide the question of retaining in the service, or rejecting, the Parrott guns. Pending this decision, they recommend to the Bureau of Ordnance that a circular be issued, directing certain. reductions of the charge of one hundred pounders, and other precautionary measures to be taken. In consideration of the endurance exhibited by the Parrot rifle guns in proof and in service the committee deem it proper to state that in their opinion, the bureau was fully justified in adopting them for the naval service, as the best guns to be obtained to meet its immediate wants—various other systems of cast-iron rifled ordnance, having either failed or been withdrawn from service as unreliable. They therefore, in the belief that the guns of this description which have burst or failed may have been affected by one or more of the causes heretofore enumerated, especially the explosion of shells within them at the time of bursting, or previously, recommended the retention of all classes of those guns, except the 156-pounders, until the experiments herein recommended shall have been made. They also suggest the immediate withdrawal of such of the guns as may have been subjected to any one of the deteriorating causes arising from premature explosions and other causes, and that they be issued to vessels of the navy only as chase guns, not to exceed two for large and one for small vessels exclusive of rifled howitzers. The report, as published in the *Army and Navy Jour.*, is accompanied by voluminous appendices, with valuable tables, by the evidence of Mr. Parrott before the committee, and by a letter from the same gentleman, giving in detail his views as to the causes of the bursting of the guns. Commodores Missroon, Hitchcock, and Hunt, and Lieutenant Commanders Aulick and Jeffers, constituted the Committee.

Steam Fire Engines.

The Buffalo *Advertiser* says:—

Never was the value of our steam fire engines more fully demonstrated than during the recent conflagration. With no sinews to tire or muscles to grow stiff, they stood there, hour after hour, obedient to the fire-men and engineers, sending their never-ceasin streams upon the flames. Even the old "C. J. Wells," which was thought to have grown feeble and useless from age and hard service, was brought into requisition, and did honor to itself and its god-father. When it was feared that the machines might be disabled from freezing, rude coverings of carpets, old quilts, etc., were erected about them, giving them a decidedly unique appearance. Ever and anon the cheery sound of the steamers' whistles would be heard, as if hailing and encouraging each other amid the storm, and still they worked ceaselessly on.

The Artillery of the Future.

Mr. W. T. Carrington, Chairman of the Society of Engineers, England, made the following assertion on the occasion of his opening address :—

"The time will come when there will be no such thing as a rifled gun—all our guns will have perfectly smooth bores. Then we shall have guns of steel of the least weight combined with the necessary strength. If a smooth bore gun be rifled it is considerably reduced in strength; let the grooves be made as small as possible, still that gun is weakened. Take a cylinder, a beam, or anything that has to resist strains and groove them in a contrary direction to the direction of the strain, as in the case of a rifled gun, and you will find them far weaker and less able to bear the same strains than the cylinder or beam without the grooves, although of precisely the same weight. It is very easy to make a small groove in any beam, and reduce its strength by one half, although its weight is reduced but a fraction. Is it wise, therefore, to weaken the greater number of our guns by grooving them when we can have better results in one sense, from a smooth bore? 1st, there is a much stronger gun from the same weight of metal; 2nd, a less costly gun; 3rdly, a gun simpler and, therefore, more easily kept in order; 4thly, less strain on the gun from the same quantity of powder and same weight of shot; 5thly, greater velocity of the shot when leaving the gun. It can easily be shown that, with the same quantity of powder and weight of metal to be projected, the strain in a rifled gun is greater than in a smooth bore. We must admit that many guns would burst if the shot was so fixed in that it could not move by the force of the powder when exploded—one method to fix the shot would be to screw it in, the inclined plane of the screw being, say, 1 in 24, the gun would certainly burst before this screw slipped. What is a rifle but a screw? Although the inclined plane is very steep, it is a screw, and therefore requires some extra force to make the ball slide on the inclined planes, and this extra strain must of necessity be given to the gun by the same quantity of powder as used in the smooth bore for a greater velocity of the projectile with less strain. What I mean is this:—Possibly the ball or shot may yet be rifled—not the gun. If the rotary motion is given by the rifling of the gun, the ball has the greatest circular motion at the commencement of its flight, and the least at its termination, so that, independent of the objections to rifling the guns, the balls have their own reasons for being rifled themselves. If the money already spent on experiments on rifled guns had been employed in experiments on feathered or rifled balls, satisfactory results might have been obtained. It can only be decided by experiment which method of rifling or feathering the balls, will be best. Many schemes have been proposed. Spiral grooves might give sufficient rotary motion; if not, a short tail, having the necessary twist or screw, or two or more twisted faces on the nose of a shell or shot—which would be acted upon like the sails of a windmill to give rotary motion—or feathers imbedded in the side of the shot until leaving the gun, when they should be made to spring out and give the necessary surface for the atmosphere to give sufficient rotary motion."

[It has always been our opinion that if a rotary motion is to be imparted to the shot at all, it must be given during its passage out of the gun. It is very certain that if shot of any kind are to be made with spiral wings or feathers, they must be long shot and not balls.—Eds.

Magnesium Light for Dyers.

A dyer of Paris some months ago, saw the magnesium light for the first time, and discovering at once that its rays left colors unaffected, exclaimed 'This is just what we have long wanted!" There are many days in winter when those who deal with delicate shades of color are utterly at a loss to discriminate between tint and tint, but the magnesium lamp will, it is thought, answer the purpose of sunlight.

THE RAILROAD UNDER BROADWAY.

We have before us a copy of a report made by A. P. Robinson, Civil Engineer, in relation to the contemplated railroad under Broadway and the Fifth avenue. It is proposed to construct a tunnel 25 feet 6 inches wide, and 16 feet high, under the middle of the street, with two railroad tracks, and with stations half a mile apart. At each station a building is to be erected on each side of the street, with one staircase to ascend and another to descend, under each building. The cars are to be each 40 feet long, besides sufficient space for a steam engine to drive it, and the number of the cars is to be equal to that of the stations, so that cars may start from all the stations at the same time. The cars are to start once in two minutes, and to occupy a minute and a half in running from one station to another. The estimated cost of the work at present prices is $8,487,000. Application for a charter is now pending before the State Legislature. The report concludes as follows:—

"I can conceive nothing so completely fulfilling, in every respect, the requirements of our population, as such a road with such an equipment, and worked in the manner suggested. There would be no dust. There would be no mud. Passengers would not be obliged to go into the middle of the street to take a car. They have simply to enter a station from the sidewalk and pass down a spacious and well-lighted staircase to a dry and roomy platform. The temperature would be cool in summer and warm in winter. There would be no delays from snow or ice. The cars would not be obliged to wait for a lazy or obstinate truckman. The passenger would be sure of a luxurious seat in a well-lighted car, and would be carried to his destination in one-third the time he could be carried by any other conveyance. These would be the advantages to those who ride, and for the other great public in the streets, there would be no collisions, no clashings, no broken wheels or fractured axles, no frightened horses or run over pedestrians. Everything would be out of sight and hearing, and nothing would indicate the great thoroughfare below.

Curious French Harness.

A French gentleman has patented a new invention for instantaneously releasing runaway horses from carriages. The driver, in case of accident, pulls a strap, by which the trace buckles are loosened and the horses run free with all the harness except the traces, which remain attached to the carriage.

[These Frenchmen always do things by halves. If a Yankee had conceived this idea there would have been an attachment to chase the horses, catch and secure them, and remonstrate with them on the impropriety of their conduct. Eds.

THE GOLDEN LILY OF JAPAN.—Several specimens of this rare and gorgeous exotic are on exhibition at the mechanic's fair, San Francisco. It is thus described: Imagine upon the end of a purple stem, no thicker then a ramrod and not above two feet high, a saucer-shaped flower at least ten inches in diameter, composed of six spreading and somewhat crisp parts, rolled back at their points, and having an ivory white skin, thickly strewn with purple points of studs, and oval or roundish prominent purple stains. To this add in the middle of each of the six yellow parts a broad stripe of light, satiny skin, and having the appearance of streamlets. From this delicious flower arises the perfume of orange blossoms sufficient to fill a large room, but so delicate as to respect the weakest nerves.

PRESERVATION OF IRON PLATES ON SEA-GOING VESSELS.—The French iron-clad frigate Invincible has just been taken into the dry dock at Castigneau, which has afforded an opportunity of judging of the efficacy of the system applied to that vessel for preserving her iron plates. A band of zinc, which by isolating the electric currents guarantees the plates from that green coating which causes injury, has transformed the nature of that vegetation, and, instead of a casing of marine herbs, there was found attached to the frigate's bottom a fine collection of corals.—*Galignani.*

[Corals must have changed their habits to grow on ships' bottoms. Should not the word be barnacles?—Eds.

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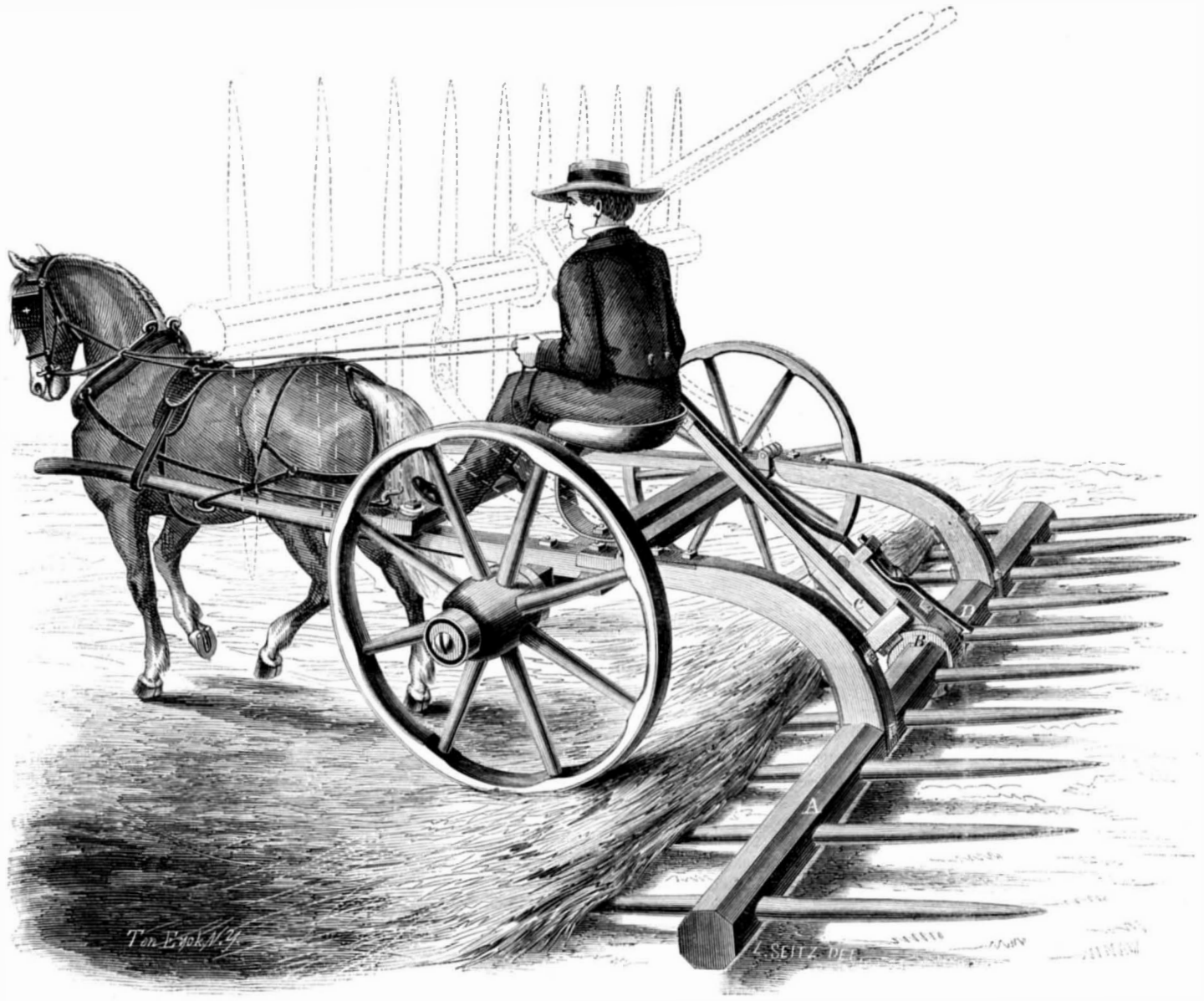
Improved Revolving Hay Rake.

The rake herewith illustrated is of the ordinary kind, with a few exceptions. The operator rides instead of walking, and the load is discharged from the seat instead of by grasping the handles behind, as in the old style. The arrangement for transporting the rake to and fro is also different. The center of the head, A, which carries the teeth has a journal on which the whole rake revolves. There are two cams, B, on the shaft which the stop, C, buts against when at work, and holds the teeth in the proper position. By withdrawing this from the seat, the head rolls over and deposits the windrow with great regularity. There is a spring catch at D which prevents the rake from slipping backward when at work.



WARNER'S REVOLVING WHEEL RAKE.

The dotted lines show the position of the rake when folded up for moving from one field to another. By bearing on the handle at the side of the driver the rake can be elevated so as to clear obstacles of any nature. The proprietor says:—

"In offering his improved rake to the public he feels sure that he has the rake especially adapted to gathering hay, and one which will command the patronage of all hay growers after practical use.

"The labor of operating this rake consists in riding upon the cart, and resting the hand steadily upon the end of the lever. When it is to be revolved, bear a little upon the lever and at the same time spring the the latch with the thumb upon the side of the lever, and the rake revolves, when the latch flies back and catches the rake from revolving the second time. In passing over obstructions the operator elevates the forward ends of the teeth by lifting up the lever; the rake may then be driven over; or, by bearing down upon the lever, the rear end of the teeth are elevated, when the rake may be backed up if desired.

This rake may be used by old men or boys, in fact, any one who is old enough to manage a horse and handle the lever. Patented through the Scientific American Patent Agency, Nov. 15, 1864.

Rights to territory for sale in any part of the United States not sold, and in any quantity to suit customers. For any information address H. N. Tracy, Painsville, Vt.

ORDNANCE AND ARMOR.

D. Van Nostrand, of 192 Broadway, New York, has just published a treatise on Ordnance and Armor, by Alexander L. Holley, B. P., and we tender our thanks to the author for a copy of the work. It is a book of 900 pages, with 493 engravings, printed in fair type on good paper, and handsomely bound. It is filled from beginning to end with the most valuable and interesting facts pertaining to the subject of which it treats. We have not space even for an enumeration of its contents, but select a few of the subdivisions as samples. Under the head of Hooped Guns there is first a description of the Armstrong gun: giving details of fabrication, breech-loading, rifling, charges, proof, cost, and endurance. Then follow the same details in relation to the Whitworth gun, the Blakely gun, the Parrott gun, and other hooped guns. The next section is devoted to solid wrought-iron guns, and contains descriptions of the Horsfall, the Stockton, the Brooklyn Navy Yard 12 in., and many other wrought-iron guns, with the particulars of their fabrication, charges, and endurance. Heavy shot at low velocities is discussed under seven heads, with full accounts of the various experiments bearing on the subject that have been made in England and America. In the same detailed and thorough manner are treated the subjects of small shot at high velocities, "The two systems combined," "Breaching masonry," "Resistance to elastic pressure," "The effects of vibration," "The effects of heat," "Elasticity and ductility," and, in short, all departments of the subject. The author asserts that the reports of experiments are derived almost exclusively from records and drawings in Government offices, with the exception of those which are taken from the pages of the Scientific American.

From the talent shown in the collection and compilation of facts, it is safe to infer that the discussions are also able; we shall notice these more at length when we have given them further examination.

Fatal Accident From Oxygen.

In December last, a Mr. Crowther, at Manchester, England, while engaged in preparing oxygen gas for the Drummond or oxy-hydrogen light, was instantly killed in his own dwelling by the explosion of his retort. His son and wife were also badly wounded. Mr. Crowther had often before prepared the gas, and it appeared at the inquest, that the explosion was due to the adulteration of the manganese used, with soot or coal, and that when a small quantity of any such organic substance is present with chloride of potash a very explosive mixture is generated in the retort.

The practice of using oxygen gas for home pictures in the magic lantern has become quite common. We have never before heard of any serious injury resulting from its preparation, though we have more than once been cognizant of the unaccountable bursting of the elastic pipe which connects the retort and the wash bottle.

We believe that the magnesium light might be substituted for the oxy-hydrogen. The metal in the form of wire, for burning, is sold in London for 1½ cents a foot. At triple this price it would be as cheap as the oxy-hydrogen light for the majority of amateurs.

A good paste for fixing paper labels on tinned sheet iron may be obtained by preparing a paste from water, rye flour, and a small quantity of a solution of glue, to which add so much of Venice Terebinth as to fit it for brushing over the labels, which will adhere closely to the thinned surface and will not be affected by moisture.

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THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT

NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XII. NO. 8....[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, FEBRUARY 18, 1865.

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THE CAUSE OF BOILER EXPLOSIONS.

We have for years been endeavoring to impress engineers and manufacturers with the necessity of caution and care as preventives of boiler explosions. We have repeatedly expressed the opinion that these disasters were not the result of mystery or of the complicated theories so often brought forward to account for them. These views were expressed as the result of experience, not of easy-chair deliberations, and we have no reason to doubt the soundness of them. We are rather strengthened in them by the following paragraph, which we cut from the report of the Manchester (England) Boiler Association.

This institution has been in existence eleven years. It consists of practical and scientific men who examine each boiler enrolled upon their list. The charge for enrollment is one guinea and a half, and if repairs be necessary or inherent weakness detected the same is pointed out and the proprietor is free to get his work done where he pleases. If any boiler *explode*, that is the word, after such examination, the proprietor thereof is entitled to recover damages from the association to the amount of $1500. The report says:—

"Ten years' actual working of this system has established its general utility to the steam user, as well as its sufficiency for the prevention of steam boiler explosions, while the constant investigations that have been made by this Association, as to the cause of those explosions which have occurred to boilers not under its inspection, have shown with what unnecessary mystery this subject has been too frequently shrouded, and that, as a rule admitting of but few exceptions, steam boiler explosions are neither accidental nor mysterious, but may be prevented by the application of common knowledge, and the exercise of common care."

This is our own opinion and every engineer may feel certain that if he understand his business and exercises caution and discretion he will never blow up his boiler.

INACTIVITY.

If a steam engine is stopped suddenly and left unused for a long period, the piston rusts fast in the cylinder, the packing corrodes the rods, and dust thickly covers every part.

When the human frame is inactive and torpid for a length of time the muscles relax, the nerves lose their tone, the organs refuse to perform their functions, and the whole of that great machine—the human frame—is disorganized.

Day in, and day out, men sit poring over ledgers and day-books until they are addleheaded, and the figures swim before their eyes. When evening comes, and business hours are over, instead of taking a walk so as to send the blood dancing and tingling to the remotest part of their frames, they pop into some car and drowsily roll to their doors. A very great portion of the minor ailments flesh is heir to is caused by laziness.

An afflicted individual goes to a doctor; "Something is wrong inside," but he does'nt know exactly where. Thereupon the physician looks grave, and says, "Ah! Dyspepsia;" and forthwith orders tonics, drastic purges, and what not, when all the lazy man wants is a two mile tramp in the Central Park, or a good old fashioned jouncing on a hard-trotting horse.

A certain eastern potentate, feeling himself out of sorts on one occasion, sent for his physician and demanded a cure.

"Take this mace," said the physician, "mount a horse and swing the instrument back and forth, riding meanwhile at full gallop. Certain drugs concealed in the handle will then exude; your excellency will absorb them and be cured." And he was, says the legend; the shrewd man of medicine knew full well that all the king required was fresh air and exercise, and he took this method of prescribing them.

It is better to wear out than to rust out, and shoe leather is far less costly than medical advice.

Stretching the legs relieves the tension on the purse strings, and the cheapest as well as the best medicine for dullness, head-aches, blue devils, stupidity, hypochondria, ill temper, and total depravity, is fresh air and sunlight. These are sovereign remedies, but because they are easily obtained, do not taste bad, and cost nothing, few use them.

THE SWEETNESS OF FERMENTED BREAD.

The little cavities in a loaf of bread, which give it its spongy character, and make it light, are formed by the expansion of little bubbles of carbonic acid gas; and there are three different methods by which these little masses of carbonic acid are mingled with the dough.

In making what is called aerated bread, the carbonic acid is obtained by any economical process, and is then mechanically mixed with the dough by agitating the two together in an air tight vessel. On being placed in a hot oven the bubbles of gas expand, and puff the dough into a spongy mass.

Soda biscuit are raised by setting free carbonic acid from bicarbonate of soda. This salt is composed of soda, carbonic acid, and water, and if it be brought in contact with tartaric acid, the soda leaves the carbonic acid to combine with the tartaric, and the carbonic acid is set free in the form of gas. Advantage is taken of these affinities to distribute carbonic acid gas in minute masses through the dough. Tartaric acid is first thoroughly incorporated with the dough, and then bicarbonate of soda is added and also thoroughly mixed with the mass. The tartrate of soda, formed by the combination of tartaric acid and soda, of course remains in the dough, and is taken into the stomach with the bread.

In fermented bread the carbonic acid is obtained from the flour. All grain contains starch, and by proper treatment starch may be converted into grape sugar, which in its turn may be changed into carbonic acid and alcohol. Both of these changes are effected by fermentation. Panic fermentation is simply the growth of yeast. Yeast is a microscopic plant, and when immersed in a proper liquid and subjected to the proper temperature, it propagates and grows with great rapidity. When it grows in contact with moistened starch it converts the starch first into sugar, and then the sugar into carbonic acid and alcohol. The sweetness of fermented bread is doubtless due to the circumstance that a portion of the sugar formed from the starch remains in the bread without being changed into carbonic acid and alcohol.

CAIGNARD DE LATOUR made the discovery that there is for every vaporizable liquid a certain temperature and pressure at which it may be converted into the aeriform state, in the same space occupied by the liquid.

EXPERIMENTS WITH CAR BRAKES.

Mr. William Loughridge, of Weverton, Md., proposes that the Presidents of the railroad companies in the United States should undertake a series of experiments "to determine the laws of friction governing the retarding of trains, by equipping a train of ten cars, to be controlled by the engineer or brakemen in such a manner as, in my judgment, will secure the greatest safety to trains and economy to the railroad companies."

Mr. Loughridge then specifies the objects he desires to ascertain: we have no space to reproduce them at length. The Presidents of the leading roads in the country have already agreed to pay their share of the expense attending the experiments, provided the sum required of each shall not exceed $100.

The experiments will be made at the Bolton machine shops of the Northern Central Railway, at Baltimore. Further information can be had by addressing Mr. William Loughridge, care of E. W. Barker, 362 North Eutaw street, Baltimore, Md.

WHAT A GREAT THING AN ARMY IS.

If any of our readers wish to form a clear and vivid conception of the appearance and extent of an army of 80,000 men, let them take a look at Mr. Hope's painting of the encampment on the Pamunkey. At the only time when the Army of the Potomac was ever all collected in one body it was fortunately spread out on ground sufficiently level for it to be seen at one view; and, fortunately, one of our best landscape painters was present, and took a careful sketch, from which he has produced a large and elaborate painting.

For several years we have observed Mr. Hope's studies of forest scenes at our artist exhibitions, and have been much impressed with their minute fidelity to nature. Some of our lazy artists, who wish to get a great deal of money for a very little work, affect to sneer at this pre-Raphaelite attention to details; but, for our part, we agree with Ruskin, that this extra finish is "added truth." In art, as in other things, and more especially in art than in anything else, excellence is to be obtained only by tireless labor. Mr. Hope has the same fault that nearly all of our landscape painters have, his landscapes are too nearly of the same color. It requires no great experience to recognize the work of any one of our prominent artists by the characteristic color. Mr. Church's landscapes are an exception to this, his paintings having the innumerable shades of green that are to be found in nature.

In minute and laborious finish Mr. Hope is not to be excelled. In this painting of the Army of the Potomac, every tent, and every tree is carefully painted in the exact position which it occupied in the landscape, the steamboats and schooners are the same in number and in form as those which were afloat at the time on the river, and the long lines of infantry, artillery and cavalry, present the same appearance in the picture that they did in winding their way out of camp. The longer the picture is studied, the more is the spectator impressed with the extent and power of an army of 80,000 men. With the idea of having such a force in our control, we can enter readily into the feelings of Marmion as he contemplated the army of James IV. before the battle of Flodden Field:—

"Oh! well, Lord Lion, has thou said,
Thy king from warfare to dissuade
Were but a vain essay:
For, by Saint George! were that host mine,
Not power infernal nor divine,
Should once to peace my soul incline,
Till I had dimm'd their armor's shine
In glorious battle fray!"

Shocking Occurrence.

On the 8th instant, 2,700 barrels of petroleum, stored in a yard in Philadelphia, took fire. Some of the barrels burst with the heat, and the blazing liquid ran into the streets and filled up the gulleys and sidewalks, so that the lower parts of the houses in the vicinity were surrounded with a lurid sea of flame. The scenes which occurred were harrowing, and no less than six persons—four or five of one family—were burnt to death on the sidewalk. Numbers of houses were laid in ruins, and the damage was very serious.

A NEW bridge has been built over the Mississippi at Clinton, Iowa. It is 3,650 feet long. The draw leaves passage ways, each 123 feet wide, for steamboats.

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ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING FEBRUARY 7, 1865.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

46,201.—Rotary Engine.—Edgar B. Adams, Robt. P. Trimble and Horatio N. Adams, Salem, Ohio:

We claim, first, The combination of an eccentric hub, D, having a groove, g, formed in it, with the revolving ring, B, elongated yoke, A, and sliding pistons. b b', operating substantially as described.

Second, The application of springs, s s', to piston rods, e e', which are connected to a yoke, E, by means of pins, f f, working in slots, i i, substantially as described.

46,202.—Churn.—David C. Aldrich, Anamosa, Iowa:

I claim the partition plates, B B, perforated at their lower ends, and provided with an oblong opening, g, in connection with the air tube, H, in the central compartment, e, and the dashers, C C, in the compartments, d d, all arranged to operate substantially as and for the purpose herein set forth.

I also claim the concave under surfaces, a*, of the dashers, in connection with the upper inclined surfaces, b*, the perforated partition plates, B B, and the air tube, H, for the purpose specified.

I further claim the water chamber, b, in combination with the perforated partition plates B B, dashers, C C, air tube, H, and thermometer, I, as and for the purpose set forth.

[This invention relates to a new and improved churn, of that class commonly termed atmospheric, and it consists in the employment or use of the dashers, perforated partition plates, an air tube, and a water chamber, all arranged in such a manner as to cause butter to be rapidly produced in good condition, and to separate the butter from the buttermilk.

46,203.—Steam Boiler.—John H. Ames, Baltimore, Md.:

I claim, first, The arrangement of flues, E' E', substantially as and for the purposes set forth.

Second, Producing superheated and saturated steam in a boiler and separating these two forms of steam from each other without injuriously interrupting the water level, substantially as described.

Third, Mixing together superheated and saturated steam in the steam pipe within the boiler, substantially as described.

46,204. Machine for Separating Lard, Tallow and Grease from the Refuse of Rendering Tanks.—Peter Andrew, Cincinnati, Ohio:

I claim, first, The trap, B, arranged as specified and shown, operating substantially in the manner described for separating the grease from the water, and for the separation of liquids of unequal specific gravity.

Second, I claim the use of wire screens, substantially as described and set forth, for the separation of lard, tallow or grease from the refuse or slush taken from steam rendering tanks, and for the separation of any liquid having no affinity for water, and of less specific gravity from any substance that is not liquid.

Third, I claim the trough or gutter, D, for the purpose of skimming the grease from the surface of the water in the vat, as specified and in the manner described.

Fourth, I claim the perforated water pipe, F, for the purpose of lifting the grease above the screens until it flows into the trough, D, and for continuing the flow and driving it into the trough, substantially as described and shown.

Fifth, I claim the bottom of the vat, formed and arranged as described and for the purpose set forth.

46,205.—Presses.—Stephen J. Austin, Freeport, Maine:

I claim, first, The expanding press box, B, constructed substantially as and for the purpose described.

Second, The ropes or chains, d d' e, pulleys, g g' h h' i m, and windlass, j, applied in combination with the movable side, a, of the press box, B, in the manner and for the purpose substantially as herein set forth.

Third, The pulleys, q q' r r' s s' and t t', applied in combination with the chains, o o', levers, D D', and follower, C, in the manner and for the purpose substantially as shown and described.

Fourth, The double drums, u u', in combination with the chains, o o', levers, D D', and follower, C, applied and operating substantially as and for the purpose set forth.

46,206.—Vessel for Holding Petroleum.—John M. Batchelder, Cambridge, Mass.:

I claim a barrel or other vessel having a lining or interior coat, formed substantially as herein described and for the purpose specified.

46,207.—Cartridge Retractor for Breech-loading Fire-arms.—Fordyce Beals. New Haven, Conn.:

I claim, first, The hammer, F, provided with the notch, l m, in combination with the ejector, G, when constructed and operating as herein set forth.

Second, I claim the spring, H, when constructed and arranged to operate in combination with the ejector, G, as and for the purpose set forth.

46,208.—Process for Manufacturing Twine from Paper.—E. B. Bingham, Newark, N. J.:

I claim in the manufacture of twine from paper, adding a waterproof sizing to the paper pulp, or applying the same to the paper while the latter is in a moist or green state, on the frame or web, previous to its passage through the final heated pressure cylinders, and previous to its being cut into strips and receiving its twist, as herein set forth.

46,209.—Molder's Bench.—Chas. L. Bishop, Meriden, Conn.:

I claim a molder's bench, composed of a bracket, A, ribs, a, and cleats, d, horizonal arms, B, and brace, C, all constructed and fitted together in the manner substantially as herein set forth.

46,210.—Mess Kit.—Erastus Blakeslee, New Haven, Conn.:

I claim attaching the pan to the kettle in the manner and for the purpose substantially as herein set forth and described.

46,211.—Tobacco Stopper.—John M. Brown, Portland, Maine:

I claim, first, The pipe cover, perforated at the center, and fitted with spring arms, having shoulders, substantially as and for the purposes described.

Second, The stopper or plunger, in combination with the rod and spiral spring, substantially as and for the purposes enumerated.

Third, The combination of the detachable cover, as described, with the spring stopper or plunger, as described.

46,212.—Handle for Lamp Chimney.—Morgan W. Brown, New York City:

I claim a metallic handle, formed as set forth, to clasp upon and be attached to an ordinary glass chimney, in the manner and for the purpose specified.

46,213.—Crane.—Benajah J. Burnett, Mount Vernon, N. Y.:

I claim, first, The cast-iron tower or column, of one or more pieces in hight, with bottom flanges or base, a, vertical cylindrical surface, d, and shoulder, f, all substantially as and for the purpose herein specified.

Second, The construction of the top of said tower, substantially as herein described, with a seat in its interior for the reception of the lower ring, i, of the box which contains the anti-friction balls upon which the cap or revolving head of the crane is supported.

Third, The cast-metal cap or revolving head, C, provided with ribs or inverted brackets, k k, for the reception of the sheave and tension bar pins. l m, and central downwardly-projecting journal, p, entering the box which receives the anti-friction balls upon which the said cap or head is supported, and receiving upon it the upper ring, i, of the said box, all substantially as herein specified.

Fourth, The annular box for the reception of the anti-friction balls which support the cap or revolving head, C, constructed of two rings, i i, the one forming the bottom and outer sides of the box, fitted into a seat in the top of the tower or column, and the other forming the top and inner sides of the box, fitted to the journal of the cap or revolving head, substantially as described.

Fifth, The construction of the circular traveler, B, with a flange for the reception of the suspending side branch rods, and with bearings for the reception of the jib shoes, and counter-weight sills, so that each thrusts against the other, and a rolling joint is provided for the said shoes to permit the adjustment of the jib, all substantially as herein set forth.

Sixth, The branch side rods for suspending the circular traveler from the revolving head or cap, constructed with their upper parts single, as shown at G, and with their lower parts in two or more branches, as shown at q q q, in Fig. 1, and combined with the cap or revolving head and traveler, substantially as herein described.

46,214.—Bottle for Oil.—Charles W. Cahoon, Portland, Maine:

First, I claim a wooden bottle, made by boring a solid block of wood, and fitted with a stopper, rendered impermeable to liquids, substantially as herein described.

Second, Fastening a stopper into a bottle by means of a button, the ends of which fit into niches, substantially as described.

Third, A bottle having a shoulder and a flaring neck, in combination with a straight side, uniform stopper, as herein described.

Fourth, A bottle fitted with channels, as herein described.

46,215.—Whip-socket Fastening.—H. W. Catlin, Burlington, Vt.:

I claim the washer, B, in combination with the screw, C, passing through the dash, D, into the socket, A, to be arranged substantially in the manner as and for the purpose set forth.

46,216.—Bean Harvester.—Norman Chappell, East Avon, N, Y.:

I claim the clearer or clearers, H, in combination with the cutter or cutters, G and a suitable frame, A, arranged and operating substantially as herein set forth.

In combination with the clearers, H, cutters, G, and frame, A, I also claim the coulters, I, arranged and operating substantially as herein specified.

46,217.—Packing for Oil Wells.—John R. Cross, Chicago, Ill.:

I claim the arrangement for artesian oil wells of a fibrous material, D, consisting of hemp or other elastic substance, in combination with the rings, A A', or other suitable frame therefor, so arranged that when said rings approach each other the packing material is compressed laterally, so as to fill the space between the tube and sides of the well, and relaxed when the rings are made to recede, the same being operated from the top of the well by the screw rods, d d, substantially in the manner and for the purpose set forth.

I also claim, in combination with said packing device, the valve, f, and tube, g, operating in the manner and for the purpose herein set forth.

46,218.—Ladies' Dress Protector.—Theodore D. Day, New York City:

I claim an interior lining or facing for the lower edge of the skirt of ladies' dresses or other garments, formed with springs introduced in the manner and for the purposes specified.

46,219.—Fire Engine.—John N. Dennisson, Newark, N. J.:

I claim the increasing or diminishing the effective area of the pump or pumps by means of a valve placed in the partition between them, or other means, substantially the same as when attached to the steam fire engines, so that the quantity of water discharged at a stroke can be increased or diminished at pleasure without altering speed or stroke, for the purposes herein set forth.

46,220.—Ball Screw for Fire-arms.—Arthur De Witzleben, Washington, D. C.:

I claim the tines or jaws, b b, with their threads or shoulders, a a, forming in combination the concave screw for the uses and purposes as above described.

46,221.—Paper-covered Wooden Boxes.—M. P. Dorsch, New York City:

I claim a box for collars and similar articles, made of a thin veneer of wood, with the top and bottom pieces secured to the sides by a strip of paper or other similar material glued around the said edges, and the box covered with paper, as specified, the whole forming a new article of manufacture

46,222.—Operating Guns in Turrets.—James B. Eads, St. Louis, Mo.:

First, I claim mounting a gun or guns upon a rotary platform, arranged to bring the muzzles of the guns to different ports in the turret or defense, within which it rotates, when the power which operates the guns is communicated through devices acting concentrically with the axis of rotation of said platform.

Second, Mounting guns on a rotating platform, which is arranged to rotate with a turret, when the power to operate the guns on said platform is conveyed to them through mechanical devices acting concentrically with the axis of said platform's rotation.

46,223.—Operating Guns and Gun Turrets.—James B. Eads, St. Louis, Mo.:

First I claim the use of a rotating tower, in combination with a rotating gun platform, when each is arranged to rotate independently of the other.

Second, The combination in one turret of devices for training ordnance operated by means of power transmitted through the pivot or shaft of the platform on which the ordnance is mounted, with a rotating platform and a rotating tower, each arranged in such a manner that the training of the guns, the rotating of the platform and the revolving of the tower may be performed independently of each other, substantially as described.

46,224.—Bread and Meat Slicer.—John E. Dow, Boston, Mass.:

I claim the application and arrangement of the slicer in the mode above described, or substantially the same.

46,225.—Revolving Fire-arm.—Wm. H. Elliott, Plattsburgh, N. Y.:

I claim, first, Dividing the cylinder, a, through its circle of chambers into two concentric parts, and having the recoil plate or breech permanently attached to the outer section, so that the core or central portion may be drawn out in a forward direction, for the purpose of introducing the cartridges, substantially as herein described.

Second, Charging the cylinder of a revolving pistol by first introducing the cartridges into the center of it, and then by pushing them in a lateral direction to their places, as herein described.

46,226.—Machine for Clipping Hair or Wool from Animals.—Charles W. Emery, Dorchester, Mass.:

I claim the upper guard, i, for holding the hair or wool erect to facilitate the cutting, as herein set forth.

46,227.—Lanterns.—Chas. Engelskirken, Buffalo, N. Y.:

I claim the expanding and contracting button, F, constructed and operating for the purposes and substantially as described.

46,228.—Fire-proof Safe.—John Farrell, New York City:

I claim the employment of sulphate of magnesia in filling in the fire-proof chambers of safes, chests and other like structures, when prepared and put in, substantially as and for the purpose specified.

46,229.—Trip Hammer.—H. E. Fessel and F. Krautwadl, Chicago, Ill.:

I claim the combination and arrangement of the devices, e f g, constituting both a tripping and adjusting contrivance, with the friction rollers, c c', crank shaft, E, and hammer, F C, in the manner and for the purpose described.

46,230.—Combining Aluminum with Vulcanite and other materials.—Nathl. C. Fowler, Yarmouth, Mass.:

I claim so combining granulated aluminum with vulcanite or rubber or analogous material, such as gutta-percha, forming a compound or composition of matter substantially as described.

Second, I claim the use of aluminum for the purpose of forming the joinings of articles made of vulcanite, for attaching rubber or vulcanite to other material, and for inlaying and ornamenting articles of vulcanite.

Third, I claim the use of vulcanite, for the purpose of attaching articles made of aluminum to other materials, or to other articles made of aluminum.

Fourth, I claim inlaying articles made of aluminum with vulcanite and imitating articles made of aluminum by a clasp, rivet or other fastening or ornamental device made of vulcanite.

46,231.—Lubricator.—Thomas W. Goodwin, Portsmouth, Va.:

First, I claim the arrangement within a lubricator of a single cock, having three or more openings, arranged in such a manner as to make an induction and eduction passage, when used as and for the purposes herein described.

Second, In combination with a lubricator, I claim the mode of charging and discharging the reservoir, by means of a single cock, arranged within a lubricator, when used substantially as described.

46,232.—Ladies' Paper Collar.—Solomon S. Gray, Boston, Mass.:

I claim as a new article of manufacture a paper, or cloth and paper collar, to which the requisite curve or shape is given by contracting one of its edges, substantially as described.

46,233.—Tobacco Paper.—Holman J. Hale, New York City:

I claim tobacco paper made substantially as above described.

I also claim the use of tobacco paper made substantially as described, in the manufacture of tobacco cartridges and tobacco rettes, made from said material, substantially as above set forth.

46,234.—Voltaic Shoe Soles.—Thomas Hall, Boston, Mass.:

I claim the combination of the non-conducting sole or base with a series of alternate plates of dissimilar metals lapping upon each other, so that their points of contact may be kept bright by the friction curved by the motion of the foot, and allowing the moisture or perspiration of the foot to act upon both metals at the juncture of the plates.

46,235.—Wire Fork for Toasting, Etc.—Thos. Geo. Harold, Brooklyn, N. Y.:

I claim, first, Constructing an apparatus for toasting, broiling, etc., of two clamps, pressed toward each other by a spring or springs, in substantially the manner described and shown.

Second, I claim retaining the said clamps in correct position to each other by guides, in the manner and for the purpose specified.

Third, I claim the combination of the clamps, a a', spring, b, and guides, c or e, for the purposes set forth.

46,236.—Hanger for Lamps.—Thomas S. Hudson, East Cambridge, Mass.:

I claim the lamp-support hanger, as composed of the series of glass tubes, the end caps or cups, the rod or its equivalent, and the end attachments, arranged relatively to one another, substantially as described.

46,237.—Shears for Cutting Metal.—Julius Hornig, Oswego, N. Y.:

I claim, first, the metal shears connecting the shear-lever to the eccentric by means of a strap guided in a groove on the eccentric, in combination with a radial arm secured to the lever by means of a pin, L, on which it is free to vibrate, substantially as above described.

Second, I also claim the curved face, d, of the upper end of the shear lever, in combination with an eccentric against whose face it moves, and against which it is held by means of a radial vibrating arm, K, substantially as described.

Third, I also claim forming shoulders, s, on the faces of the washers, O, and shoulders, t, on the faces of the bosses or projections, q, in order to prevent the rotation of the washers during the vibrations of the lever, substantially as described.

[This invention consists in a novel method of holding the free end of the lever of a shears up to, or rather of connecting it with, the eccentric which operates the shears, and also in the application of a washer to the hub or trunnion of the shears.]

46,238.—Device for operating Safety Valves.—William S. Hudson, Paterson, N. J.:

I claim the bell crank levers in combination with the means, I, M, or their equivalents, for rapidly changing the initial tension of the spring, I, within wide limits, substantially as and for the purpose herein set forth.

46,239.—Key Fastener.—Henry Hungerford, Brooklyn, N. Y.:

I claim the combination and arrangement of the bolt, C, constructed substantially as described, and its guide or case, B, with the perforated key, the whole combined and operating substantially as and for the purposes set forth.

46,240.—Extension Table.—Anthone Iske, Lancaster, Pa.:

I claim the central column or support, A, with its cross pieces, B C, and slots, d, in combination with the cross slats, s, and their sliding pivots, 2 3 4 and 5, in said slots, d d d d, arranged and operating substantially in the manner and for the purpose specified.

46,241.—Lock.—Henry Jackson, Brooklyn, N. Y.:

I claim stub, F, constructed as described of a plurality of movable plates, c c, of unequal length or projection, employed in combination with the tumblers, E, in the manner and for the purpose specified.

[The object of this invention is to prevent a lock being picked or opened illegitimately by obtaining a pressure of the stub on the tumblers—a means usually resorted to by burglars in order to ascertain the position the tumblers must be brought to in order to admit of the bolt being liberated.]

46,242.—Machine for Pointing Wires in the Coil.—C. Jillson, Worcester, Mass.:

I claim combining the cutter head and pattern with a revolving shaft having a spring or yielding roll within it, as and for the purpose herein described and represented.

I also claim, in combination with a revolving cutter head and pattern, the extending of the cutter stock or cutters that are operated by said pattern clear through the cutter head, so that said cutters will not be thrown out or in any wise moved by the centrifugal force of the revolving head, substantially as described.

46,243.—Revolving Firearm.—Benjamin F. Joslyn, Stonington, Conn.:

I claim the rod, I, and its transverse rod, m, in combination with the recessed and inclined end of the hammer—the whole being arranged and operating for the locking and unlocking of the cylinder substantially as and for the purpose herein set forth.

46,244.—Apparatus for Evaporating and Calcining Alkaline Solutions.—Morris L. Keen and Hugh Burgess, Rogers Ford, Pa.:

We claim a furnace constructed for the purpose of evaporating the alkaline solutions used in the pulping and disintegrating of vegetable substances, in which the heat is utilized by means of an arrangement of pans, or their equivalents, substantially as and for the purpose described.

We also claim, in combination with the main evaporator, the finishing or calcining furnace or furnaces, substantially as described.

46,245.—Corn-sheller.—Charles Ketchum, Penn Yan, N. Y. Ante-dated Jan. 29, 1865:

I claim, first, The cylinder, H, when made as specified and used for the purpose set forth.

Second, I claim the concave when composed of the sections, F, substantially as specified.

Third, I claim the guides, M, and agitators, I, when constructed, arranged and used as specified.

Fourth, I claim encasing the concave, substantially as specified, and for the purpose set forth.

Fifth, I claim the plates, B and C, and hopper, L, when constructed

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as specified and used in combination with the other parts of the machine as set forth.

46,246.—Tapping Branch for Water and other Pipes.—Henry Knight, Brooklyn, N. Y.:

I claim as a new and improved article of manufacture the flanged cup, A, having one end closed, and otherwise adapted to form connections for pipes.

46,247.—Process for Preserving and Restoring Natural Flowers.—Angelina J. Knox, Boston, Mass.:

I claim the process for restoring, treating and preserving natural flowers, substantially as herein before described.

46,248.—Car-bumper Attachment.—John P. Laird, Altoona, Pa.:

I claim, first, The guide plates, F, imbedded in the wooden blocks, E E, and secured to the beams of the car, all substantially as and for the purpose herein set forth.

Second, The stirrup, N, confined between the beams, E E, and secured to the bumper beams, substantially as specified.

Third, The adjustable stopping blocks, M, adapted to the plates, F and G, and to a bolt, b, which passes through the same, all substantially as set forth for the purpose specified.

46,249.—Ventilating and Check Draught Damper.—James A. Lawson, Troy, N. Y.:

I claim the employment of a horizontal damper in any stove or furnace exit-pipe, and of less diameter than such pipe, and above a vertical cylinder damper around such pipe, so as to more effectually check the draught by bringing the hot air within the said pipe in contact or conjunction with cold air admitted from room surrounding such pipe through said vertical cylinder damper, in the manner substantially as herein described and set forth.

I also claim the combination of the vertical cylinder damper, B2, with the horizontal damper, C, arranged immediately over the said vertical cylinder damper, B2, in the manner substantially as and for the purposes herein described and set forth.

46,250.—Heaters for Buildings.—James A. Lawson, Troy, N. Y. Ante-dated Nov. 15, 1864:

I claim the employment of the return flue space or chamber, G, in combination with the vertical pipes, D and E, and with the fire chamber A, in the manner and for the purposes substantially as herein described and set forth.

46,251.—Shutter Hinge.—Robert Lee, Cincinnati, Ohio:

I claim as a new article of manufacture the shutter hinge herein described, consisting of the parts, A B, flange C, the radial notches, c c c, gravitating catch, D, fulcrum pin, d, and hand lever, E, all constructed, arranged and operating as specified.

46,252.—Feed Water Heaters for Steam Boilers.—Wm. A. Lighthall, New-York City:

I claim the heater, I, arranged as described, and placed between the exhaust of a steam engine and the condenser, A, as and for the purpose set forth.

46,253.—Condenser Case.—Wm. A. Lighthall, New York City:

I claim the manner of constructing the sides, A A', of the case, with the apertures, a, combined with the manner of securing the tube sheets, B B', and division plates, D D (or either of them), in place, as herein set forth.

46,254.—Condenser.—Wm. A. Lighthall, New York City:

I claim, first, The combination of the division plate, C', with the section of cooling tubes, A, as and for the purpose set forth.

Second, The combination of the division plate, C', with the tube sheet and cover to the end of the case (as shown), for the purpose of dividing the space between the said tube sheet and cover into two sections as set forth.

Third, The arrangement of the cooling water receiving nozzle, B, the cooling water delivery nozzle, D, the steam nozzle, E, the condensed water nozzle, G, and the division plate, C', placed at the same end of the apparatus as shown, and for the purposes set forth.

46,255.—Funnel.—C. L. Lochman, Carlisle, Pa.:

I claim the valve or stopper, c, with its handle and connecting rod, h and l, or their equivalents, the elastic cone or washer, g, or its equivalent, the cock, d, and springs or catches, m m, constructed and connected substantially as and for the purposes specified.

46,256.—Drafting Scale.—Josiah Lyman, Lenox, Mass.:

First, I claim such an arrangement, application and graduation of the beveled edge of the scale herein set forth as render it a universal reliable guide to the needle point in making a dot on the paper at the end of any required or given distance.

Second, The arrangement and application of the slide spring, as set forth, to the scale herein described, by which it is brought in contact with and becomes a part of the protracting trigonometer, or of a T square.

46,257.—Hoisting Apparatus.—Walter K. Marvin, New York City:

I claim the method herein described of applying power to hoisting apparatus by the employment of friction pulleys operating by compression upon a rope or cable or the equivalent therefor, substantially in the manner herein set forth.

46,258.—Hobby Horse.—P. J. Marqua, Cincinnati, Ohio:

First, I claim the combination rearing hobby horse, A, vibrating beam B, seat, I, and spring, K, arranged and operating substantially as set forth.

Second, The slots, G G', and the devices for the relative adjustment of the seat and horse as explained.

Third, The arrangement of the rearing hobby horse, A, seat, I, reins, O O', and pulley, T, adapted to operate as set forth.

Fourth, I claim the india-rubber thong, K, and clamp, L L' M, arranged as set forth.

46,259.—Breech-loading Ordnance.—John A. Miller, Paducah, Ky.:

I claim the shape and construction of the balance, C, operating in a corresponding curved aperture, E, in the breech of the gun, in combination with the support, B, as herein described, for the purpose of firing cannon rapidly.

46,260.—Evaporator for Saccharine and other Liquids.—Jonathan E. Morse, Boston, Mass.:

I claim a train of evaporating pans with furnaces and flues arranged to operate in connection therewith, substantially as described.

Also, the employment with an open evaporator of a cover and steam jets, when arranged to operate substantially as specified.

46,261.—Machine for Bending Sheet Metal.—Samuel Pennock, Kennett Square, Pa.:

First, The hinged removable and adjustable bedplate, C, constructed and operating as described.

Second, In combination with the above, the mode described of adjusting the bedplate, C, horizontally by means of the eccentric, G, arranged and operating as shown, or in an equivalent manner, for producing the same result.

Third, In a machine for bending metal constructed as described, adjusting the bedplate, C, vertically, by the employment of the eccentric, R, arranged and operated as shown, or its equivalent, substantially in the manner specified.

46,262.—Horse-shoe Calk.—James L. Pike, Lynn, Mass.:

I claim as a new article of manufacture a horse-shoe calk of chilled or "case-hardened" cast iron, constructed substantially as and for the object specified.

46,263.—Mangle.—Wm. Radbourne, Rahway, N. J.:

I claim the application to a mangle of the semi-elliptical spring, D, acting simultaneously on both boxes of the roller, C, in combination with friction rollers, e, supporting the gudgeons of the lower roller, constructed and operating substantially as and for the purpose set forth.

[This invention relates to a mangle the lower roller of which has its bearings on friction rollers, while its upper roller is pressed down by the action of a semi-elliptic spring and thumbscrew in such a manner that one spring and screw are sufficient for both ends of said roller, and that by the action of the friction rollers the power requisite to operate the mangle is materially reduced. The frame of this mangle is provided with two hinged tables, one on either side of the rollers, and provided with hinged legs in such a manner that when the mangle is not used, said tables can be readily turned down out of the way, and when the same is used, one or both tables can be turned up instantaneously, and the clothes are run through the rollers with great convenience.]

46,264.—Belt Coupling.—A. C. G. Rathburne and A. M. Comstock, Lyme, Conn.:

We claim the plate, A, provided with a slot, a, and operating in combination with the toggle jaws, B, substantially in the manner and for the purpose set forth.

[This invention consists in the employment or use of a plate provided with a slot to admit the ends of the belt to be coupled and with two toggle jaws in such a manner that when the jaws are thrown open, the ends of the belt can be easily passed up between them, and the jaws are depressed after the ends of the belt have been adjusted; they clamp the same tight without the use of rivets or any other fastening, and a belt coupling is effected which leaves the inner or working surface of the belt perfectly flat and intact.]

46,265.—Washing Machine.—Orrin Reeve, Greenport, N. Y.:

I claim in combination with a tub having ribs, a, on its inner perimeter extending from the bottom to the top thereof, and radial flutes or ribs on its bottom, a rubbing board to act in conjunction therewith, having a scalloped perimeter and radial ribs on its under side, as and for the purpose herein described and represented.

46,266.—Vapor Lamp.—J. J. Riddle, Cincinnati, Ohio:

I claim, first, The use of the needle, n, working through the burner and from the outside of the lamp into the valve, d, in combination with the oil tube, O, reservoir, A, and air pump, P, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, The valve, S', applied in combination with the case, t, and air pump, P, as specified.

Third, Placing the valve seat, d, in the top of the burner, substantially as shown in figure 3, for the purposes set forth.

Fourth, The combination of the socket, R', and pipe, g", with the oil tube, O, needle, n, valve seat, d, air pump, P, and reservoir, A, constructed and operating in the manner and for the purpose herein specified.

[The object of this invention is a vapor lamp which combines cheapness and simplicity with few or no joints liable to work loose, and in which all the parts are so arranged as to be repaired easily and quickly.]

46,267.—Trip-hammer.—T. J. Root, Galena, Ill.:

I claim the rock shaft, B, with hammer rod, C, attached, in combination with the knuckle-jointed arm, H I, provided with the spiral spring, J, and treadle, F, all constructed and arranged to operate as and for the purpose herein set forth.

[This invention consists in attaching the rod of a hammer to a rock shaft or head which is connected by means of a bent arm and rod to a treadle, the treadle rod having a spring applied to it, and all arranged in such a manner that the operator by means of his foot acting upon the treadle is enabled to give the proper movement to the hammer—the latter after giving its stroke quickly using and operating smoothly throughout without any irregular movement, and with but a moderate effort on the part of the operator.]

46,268.—Machine for Jointing Oval Frames.—James E. Rogers, Chelsea, Mass.:

I claim as my invention the jointing apparatus or machine, composed of the two platforms, A B, the stops, b f, and adjustable rests, C D, arranged and constructed substantially in manner and so as to operate as and for the purpose specified.

46,269.—Tobacco Pipe.—Louis Saarbach, Philadelphia, Pa.:

I claim the curved tube, A, combined with the detachable bowl, c, stem, B, and reservoir, D, as and for the purpose described.

46,270.—Mode of constructing Dolls' Heads and other Toys.—Lucretia E. Sallee, Decatur, Ill.:

I claim, first, Making dolls' heads and other toys of an outer covering of leather, or its equivalent, and an inner body of cement, which sets and hardens, so as to support the said covering in shape, substantially as above described.

Second, I also claim the cement or composition above described for making a body or backing to sustain the outer surface of the toy.

[This invention consists in making the heads of dolls and other toys of such materials and in such a way as to prevent them from being easily broken by falls or other violence which may happen to them.]

46,271.—Seeding Machine.—William Saxton, Venice, Mich.:

I claim, first, The pivoted seed distributing plates, H, arranged within the seed-box, D, in combination with the projections, d, on the wheels, B B, the springs, c, on the adjustable seed-box, D, all arranged substantially as and for the purpose herein set forth.

Second, The coverers, J J, attached to the seed-box by links, K K, in connection with the cord or chain, L, substantially as and for the purpose herein described.

[This invention relates to a new and improved seeding machine of that class which drops the seed in hills, and it consists in a novel and improved seed-dropping mechanism, and in a novel arrangement of the seed-box or hopper and coverers, whereby several advantages are obtained.]

46,272.—Brick Molds.—John F. Schuffenecker, Saint Louis, Mo.:

I claim operating the bottoms of the molds by means of the lever, D, rod, F and G, link, I, and axles, E E, for the purpose above specified.

46,273.—Machine for making Bricks.—John F. Schuffenecker, Saint Louis, Mo. Ante-dated Feb. 3, 1865:

First, I claim the manner adopted by using the toe, j, pan, i, cup, k, and tube, h, in combination, for the purpose herein described.

Second, I claim the scraper, A, operated by the cams, i i, fork lever, j, and joint, K, as for the purpose above described.

Third, I claim the manner to secure the position of the scraper, A, by means of the spring, Z, and arm, I, as shown in the specification.

Fourth, I claim the manner adopted to regulate the friction of the machine by the cams, u u, lever, l, guide, g, set screw, h, in combination of the slot of the rod, x, as shown and described in the foregoing specification.

Fifth, I claim the mode adopted to prevent the clay from settling between lopper and the quadrant by means of the plate, S, grooves, R, steel bar, m, and set screws, Q Q Q Q, or their equivalents, for the purpose set forth.

46,274.—Cultivator and Harrow.—Thomas Short, Fairmount, Ill.:

First, I claim the frames, D D, provided with shovels, E, and teeth, F, the clevises, a a, and screws or bolts, a1, in combination with the adjusting frame, G H, the latter permitting the cultivator frames to be operated simultaneously or independently, and adapting said frames when used as a harrow to be brought together at their rear ends, as herein specified.

Second, I claim the combination of the treadles, I, loops, J, and connecting rods or wires, i, for adjusting the frames, D D, substantially as explained.

[In this machine a novel and very simple arrangement of devices is provided to facilitate the vertical adjustment of the shovels to avoid obstacles; and in addition to this feature the cultivator frames are provided with harrow teeth, and the frames are adapted to be reversed in such manner that the said teeth may be presented in a downward direction, so as to convert the implement into a harrow when desired.]

46,275.—Drying and Glazing Gunpowder.—William S. Bates, Westfield, Mass., and Catharine S. Smith, Kingston, N. Y., executors of John Smith (dec'd).

We claim the application of heat to the cylinders or other vessel in which powder is glazed, while the process of glazing is going on, for the purpose of glazing and drying the powder at one operation, substantially as above described.

We also claim the method of carrying the same into operation by means of hot air and the apparatus above described, substantially as above set forth.

46,276.—Buildings or Rooms for the preservation of Food and for other purposes.—Daniel E. Somes, Washington, D. C.:

I claim, first, The walls and chambers as described in combination with the cooling and ventilating pipes, constructed and used as and for the purpose set forth.

Second, The series of rooms and buildings, substantially in the manner and for the purpose shown.

Third, The series of walls and chambers when used in combination with a process of rarification and ventilation and cooling appliances.

Fourth, I claim cooling the air in buildings in which water tanks or pipes are used by passing the air tubes or ducts through, in between, or around the water pipes or tanks.

46,277.—Refrigerator for Preserving Articles of Food.—Daniel E. Somes, Washington, D. C.:

I claim, first, A refrigerator with multiple wall and so constructed that the interior shall be separated from the cooling substance thereby excluding dampness.

Second, The use of cork for the walls in the manner and for the purpose shown.

Third, The use of glass for the walls as and for the purpose set forth.

Fourth, The pipe larger at the bottom than top substantially as described.

Fifth, The air tight compartments substantially as and for the purpose shown.

Sixth, The vulcanized rubber tubing or its equivalent when used in the manner set forth.

Seventh, The vulcanized rubber tubing when applied to any door or drawer for a similar purpose.

46,278.—Eccentric Adjustment.—J. M. Stone, North Andover, Mass.:

I claim for the purpose of adjusting the amount of throw of any of two or more eccentrics on the same shaft. The construction and arrangement operating substantially as described.

46,279.—Paper Collar Button-hole Punchers.—Samuel S. Stone, Troy, N. Y.:

I claim, first, Two oblong, male end button-hole punchers, L L, arranged lengthwise or nearly so to each other upon, and adjustable longitudinally with two separate simultaneously reciprocating slides, H H, in combination with two corresponding oblong female punch receiving dies, N N, having like arrangement and longitudinal adjustment on a stationary bed, substantially as herein described.

I also claim two oblong end button-hole punchers adjustable axially on and longitudinally with two separate simultaneously reciprocating slides in combination with two corresponding punches receiving dies having like axial and longitudinal adjustment on a stationary bed, substantially as herein described.

I also claim two oblong end button-hole punchers, L L, arranged lengthwise or nearly so to each other and a central one, M, arranged crosswise thereto on separate simultaneously reciprocating slides, H H, and, I, and with the central punch and slide adjustable transversely to the end ones, in combination with two corresponding punch-receiving end dies, N N, and a transversely adjustable central one, o, on a stationary bed substantially as herein described.

I also claim two oblong end button-hole punchers arranged lengthwise or nearly so to each other and a central one placed crosswise thereto on separate reciprocating slides, and with the end punchers and their slides adjustable longitudinally in combination with corresponding central and longitudinally adjustable end punch-receiving dies on a stationary bed, substantially as herein described.

I also claim two oblong end button-hole punchers arranged lengthwise, or nearly so to each other, and a central one placed crosswise thereto, on separate simultaneous ly reciprocating slides, with the end punches and their slides adjustable longitudinally and the central ones transversly in combination with corresponding longitudinally adjustable punch-receiving end dies, and a transversly adjustable central one on a stationary bed, substantially as herein described.

I also claim a central oblong button-hole punch and two axially adjustable end ones, on separate simultaneously reciprocating slides with the end punches and slides adjustable longitudinally and the central ones transversly in combination with corresponding axially and longitudinally adjustable end punch-receiving dies, and a transversely adjustable central one on a stationary bed substantially as herein described.

I also claim two oblong button-hole punches and a central one, all adjustable axially on separate simultaneously reciprocating slides with the end punches and slides adjustable longitudinally and the central ones transversely in combination with corresponding axially and longitudinally adjustable end punch-receiving dies and a transversely and axially adjustable central one on a stationary bed substantially as herein described.

And I also claim the arrangement of adjustable guides, d, in combination with end or end and central button-hole punchers arranged on and adjustable laterally with separate simultaneously reciprocating slides and working into corresponding adjustable punch-receiving dies on a fixed bed plate, substantially as and for the purpose herein set forth.

46,280.—Apparatus for Carbureting Oil.—John B. Terry, Auburndale, Mass.:

I claim the combination of one or more air cells, and vibratory scoops or buckets applied together and within the cistern, A, substantially in manner and so as to operate therewith as described.

I also claim the combination of the "Barker's Mill," or rotary air and agitating distributer, K, with the vaporizing cistern, B, the cistern, A, and its air forcing apparatus.

I also claim the combination and arrangement of the shaft, F, its arms and sponges, or their equivalents, with the agitating and air distributer, K, the cisterns, A B, and the air forcing apparatus of the cistern, A.

I also claim the combination of the friction brake apparatus, consisting of the lever, W, the constructing rod, Y, the arm, z, the screw shaft, a', and the stud, b', or its equivalent for the purpose set forth with the air forcing apparatus and the vaporizing cistern, B, provided with the bell, c, to operate as specified.

I also claim the said friction apparatus constructed substantially as described as well as its arrangement with respect to the bell, c, and the vibratory sector as specified.

46,281.—Machine for Planting Potatoes.—Joseph S. True, Garland, Maine:

I claim, first, A reciprocating slide provided with one or two boxes and arranged in relation with bottom plates one or more to operate in the manner substantially as and for the purpose herein set forth.

Second, A horizontal stationary cutter or knife arranged with a reciprocating slide and boxes to operate substantially as and for the purpose specified.

Third, The placing of the cutter or knife in such a relative position with the sliding boxes that the latter will feed or convey the potatoes to the former both above and below it as set forth.

Fourth, The furrow share, F, at the bottom of the seed-conveying tube, F, the covering shares, G G, and roller, I, when used in combination with the potato-dropping-device, substantially as and for the purpose set forth.

[This invention relates to a new and improved machine for planting potatoes, and it consists in a novel arrangement of parts where by the potatoes may be cut or not as desired, planted either in hills or drills, different quantities of seed discharged at regular intervals as may be required, and the machine rendered capable of being manipulated or worked with the greatest facility and adapted for use on various kinds of ground, rough or smooth, mellow and friable or hard and clayey.]

46,282.—Bill Holder.—Charles T. Wakeley, Madison, Wis.:

I claim the hasps or fasteners, C, and D, in combination with the straps and bands, I, and H, adjustable in the manner and for the purposes shown and described.

46,283.—Soda-water Apparatus.—Frederic A. Weber and Wm. H. Greene, Woonsocket, R. I.:

We claim the valve case, d, when arranged within the box, a, and with the system of sirup pipes, i, fountain pipe, e, and outlet pipe, f, connecting therewith, the valves in the sirup and fountain pipes being operated by a system of levers and valve rods, and the whole constructed and arranged substantially as shown.

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46,284.—Draught Tube for Soda-water Apparatus.—Frederick A. Weber and Wm. A. Greene, Woonsocket-R. I.:

We claim the construction of a draught tube for soda-water apparatus, with an inner tube, b, having an outlet, d, and lateral orifices, e, opening into the tube, a, and controlled by a gate, f, the whole being constructed and arranged to operate substantially as set forth.

46,285.—Corn Plow.—Wm. S. Weir, Jr., Monmouth, Ill.:

I claim the curved rods, M, attached to the back end of the bars, d d, and bent in the form of hooks, k, at their lower ends, in connection with the lever, o, attached to the back end of the draught pole, C, all being arranged and applied substantially as and for the purpose specified.

[This invention relates, first, to a new and useful equalizing attachment, for equalizing the draught of the machine; second, in an improved manner of attaching the plows to the main frame of the machine, whereby the former may be raised and lowered, and adjusted laterally, as may be required, with the greatest facility; third, in a novel and improved means for holding the plows in an elevated state out of the ground, when the machine is being drawn from place to place, or when being turned at the ends of rows.]

46,286.—Magazine Breech-loading Fire-arms.—Henry F. Wheeler, Boston, Mass.:

I claim a fire-arm, having a sliding barrel, the charge of which, inserted at the breech, is fired by driving back the barrel against a percussion or breech block.

I also claim the swinging breech or percussion block, constructed and arranged to operate with respect to the barrel and the magazine or cartridge tube, substantially as set forth.

I also claim the magazine or cartridge tube, when arranged to connect with and be disconnected from the barrel, substantially as set forth.

I also claim holding the barrel in forward position, or the arm cocked, by the employment of the forward end of the magazine tube, substantially as described.

I also claim the arrangement of the breech or percussion block to swing above the path of movement of the cartridge tube, to permit the connection of the cartridge tube and barrel and the cocking of the piece.

Also, the arrangement of the cartridge tube, to allow of its movement to permit the descent into place of the breech block, and the spring movement of the barrel.

I also claim the manner of withdrawing and expelling the shell of the exploded cartridge by detaining it upon the cartridge tube or breech block, and throwing it therefrom, substantially as set forth.

I also claim producing the forward movement of the barrel and the downward movement of the cartridge tube by the direct action of the trigger lever, substantially as set forth.

I also claim the arrangement of a barrel within a case or cylinder containing the spring, by which the rear or percussion movement of the barrel is produced.

I also claim so combining the magazine tube and percussion block that they move together or as one piece, substantially as set forth.

46,287.—Apparatus for Calcining Ores.—George W. White, New York City:

I claim, first, The combination in the rotating cylinder of separate combustion and calcining flues or passages, substantially as and for the purposes herein specified.

Second, The furnace located at the opposite end of the rotating cylinder to that at which the ore or other substance to be calcined enters, substantially as and for the purpose herein set forth.

Third, So combining the calcining flues or passages of the rotating cylinder with the furnace, that the gases eliminated from the ore or other substance in the said passages may enter into combustion in the furnace, substantially as and for the purpose specified.

Fourth, In a rotating cylinder, with separate combustion and calcining flues or passages, combined with a furnace, as described, I claim constructing the inner surfaces of the separate calcining passages with grooves, cavities or projections, substantially as and for the purpose herein specified.

Fifth, The coiled perforated water pipe, f, placed in the smoke stack or vertical flue, in combination with the rotating cylinder, substantially as and for the purpose herein specified.

46,288.—Clasps for Wearing Apparel.—Frederick Wood, Somerville, Mass.:

I claim the improved fastener, as composed of two parts, A B, made substantially as described.

46,289.—Pencil Sharpener.—Rufus Wright, New York City:

First, I claim the spiral and tapering cutter, A, constructed in the manner and employed for the purpose herein specified.

Second, I claim the guard, B, formed in one piece, with the cutter, A, and employed to protect the same, and as a protection from the same, as set forth.

Third, In combination with a guard, B, constructed as herein described, I claim the angular groove, O', for pointing the lead.

46,290.—Mop Holder.—Thomas C. Ball (assignor to Lewis Graham, Henry Harlow and A. G. Washburn), Springfield, Vt., and said Henry Harlow and A. L. Thompson, administrator of the estate of Lewis Graham, assignors to A. G. Washburn. Ante-dated Feb. 14, 1863:

I claim the combination and arrangement of curved springs, a a a a, substantially as described, with the slotted head, B, as set forth.

46,291.—Forming Paper Collars.—William S. Bell (assignor to himself and W. S Bell, Jr.), Boston, Mass.:

I claim the improved method of treating paper collars or collar blanks, to define and determine the line of fold, substantially as set forth.

46,292.—Cartridges for Breech-loading Rifled Fire-arms.—Hiram Berdan (assignor to Levi P. Morton, trustee of Hiram Berdan, Abia A. Selover and Wm. B. Benson), Boston, Mass.:

I claim an indestructible cartridge case, with an irregular exterior to correspond with the counter bore, with which it is to be used, and a rifled interior, to correspond in size and form with the bore proper, in combination with one or more projectiles previously prepared, to fit the rifling of the bore, the whole constructed and arranged substantially as herein described, so that the chamber will be protected from fouling, and the balls properly located in respect to the rifling of the bore, without the necessity of their entering the latter in the act of loading.

46,293.—Coal and Ash Sifter.—Abijah E. and Josiah B. Blood (assignor to themselves and Wm. J. and Benjamin F. Larabee), Lynn, Mass.:

We claim, first, The construction of coal sifters, with a vibratory bottom, C C, separate from the inclosing case, B B A A, carrying the screen, D, or wire cloth, E, with free movement independently of the stationary case.

Second, The construction of the vibratory bottom or screen, E, with a decided convexity upward.

Third, The combination of the case, A A B B, with the cross bar, Q, fastened thereto, the operating rod, D, and the independent convex screen, E, substantially as described and for the purpose set forth.

46,294.—Picking Cylinders of Machines for Disintegrating Fibrous Materials.—Seth Boyden (assignor to Henry H. Jacques), Newark, N. J.:

I claim binding the picker cylinders of pickers for disintegrating fibrous materials, as and for the purpose described.

46,295.—Flexible Pipe for Mining.—Anthony Clark (assignor to himself and Gorham Blake), Todds Valley, Cal.:

I claim the improved flexile conduit, made as described, viz., of metallic pipes, cloth connections, clamping rings, valves and valve openings, constructed and arranged together, substantially as represented and explained

46,296.—Coat and Hat Rack.—George F. J. Colburn, Newark, N. J., assignor to James T. and Horace A. Pratt, New York City:

I claim the combination of the hook, C, bar or strip, A, attachments, D D, constructed, arranged and applied in the manner and for the purpose set forth.

46,297.—Rivets.—John N. Dennison (assignor to himself and Gould Brothers), Newark, N. J.:

I claim a rivet or a washer, with a projecting edge, constructed in the manner and for the purpose herein above specified.

46,298.—Tree Protectors.—Theophilus Hilton, Providence, R. I., assignor to himself and Wm. D. Hilton, Cranston, R. I.:

First, I claim the hood, C, for a tree protector, composed of the flanch, b, rod, c, and lip, a, and united by means of a clasp, e, the whole constructed substantially as described.

Second, I claim the construction of a hood, as described, or its equivalent, with a trough or its equivalent, encircling the trunk of a tree, substantially as and for the purpose specified.

46,299.—Shoes.—Joseph B. Johnson (assignor to himself and Charles Buffune), Lynn, Mass.:

I claim the above-explained improvement in lasting a shoe, the same consisting in the employment of a false inner sole, B, in connection with the last, E, and upper, A, and drawing the upper on the said sole and last by means of thread or sewing, f, or the equivalent thereof, extended across the inner sole, but without going into or through it.

I also claim the combination of two, or any other suitable numoer of pins and clamps, a b c, or their equivalents, with the false inner sole, B, and for the purpose of holding the main sole in place with respect to the upper, when the latter is confined to the false sole by thread or sewing, f, or its equivalent, going across the false sole, in manner substantially as specified.

I also claim the combination of the spurs, g g, or their equivalents, with the false sole, B, and the upper, A, when lasted as specified, such spurs being for the purpose of maintaining the said upper and the outer sole in their proper relation at or near the ball of the foot.

I also claim the combination of one or more pins, a c, or their equivalents with the false sole, B, and the sewing, f, extended across such sole and about the said pin or pins substantially in manner as herein before explained.

I also claim the arrangement of the inner sole, B, and the sewing, i, by which the outer sole, C, and the upper, A, are united, the said sewing under such arrangement being carried around and outside of the periphery of but not through the inner sole.

46,300.—Combined Rakes and Reels for Harvesters.—Samuel Johnston, (assignor to himself and Rufus L. Howard), Buffalo, N. Y.:

First I claim making an automatic rake and reel combined so that the operator can by means of a lever and cord, and the arrangement of two tracks or ways in which the elbow of the rake moves, cause either rake head to operate at pleasure as a rake and at the same time act continuously as a reel, all constructed in the manner herein described and substantially as and for the purposes set forth.

Second, I claim in an automatic rake and reel combined for harvesting machines, the arrangement whereby the operator without stopping the action of reeling can drop either of the rake heads down to the platform and hold it thereon, while removing the grain therefrom, constructed substantially as described and for the purposes set forth.

Third, I claim the arrangement of the tracks or ways when they are arranged so that in reeling the rake or rake head will drop down nearly to the cutters and move the cut grain back from them and then rise up and pass over the cut grain, substantially as described and for the purposes set forth.

Fourth, I claim the arrangement of the driver's seat in connection with the lever, cord, and gate, substantially as described and for the purposes set forth.

Fifth, I claim in a combined automatic rake and reel, changing the path of the roller which controls the motions of the rake when it is removing the grain from the platform, substantially as described and for the purposes herein set forth.

Sixth, I claim the arrangement of the two tracks or ways in combination with the gates or switches, for the purposes herein set forth.

Seventh, I claim the lever and spring, attached to the forward gate, in connection with the cord for operating the same, for the purposes set forth.

Eighth, I claim the use of the pointed washer attached to the elbow of the rake below the roller for the purposes set forth.

Ninth, I claim the hinged extension attached to the outer end of the rake head applied substantially as described and for the purposes set forth.

And, tenth, I claim the combination of the elbow of the rake head with the roller and the outer and inner tracks or ways, constructed substantially as described and for the purposes set forth.

49,301.—Coffee Roaster and Grain Dryer.—Gilbert D. Jones, (assignor to himself and Charles Place,) New York City:

I claim forming a coffee roaster, of a series of horizontal plates, each arranged to rotate within a closed box, the bottom of which is also horizontal, and which boxes receive and discharge near the center, substantially in the manner set forth herein.

46,302.—Apparatus for Carbureting Air.—Hugh L. McAvoy, (assignor to himself and Elias S. Hutchinson,) Baltimore, Md.:

I claim manufacturing air gas and enriching other gas, by the described mode of using a holder, C, to contain air, receive the carbonaceous matter as it rises from the oil in the form of vapor, and force the gas into the pipe, wherein it is conducted off, as explained.

Second, I claim the plate, E2 employed in connection with the pin, E, to cause the air to pass to the pipe, B, in contact with the oil and in a state of compressure substantially as set forth.

Third, I claim the sealing device consisting of the cup, F, cylinders, G G, and a body of liquid between the latter, substantially as described.

46,303.—Sewing Machine.—James S. McCurdy, Bridgeport, Conn., assignor to Elias Howe, Fairfield, Conn.:

I claim the combination in a sewing machine of the reciprocating needle bar with a double headed rotating hook so formed that when rotated in combination with a reciprocating needle it will draw a loop of needle thread through the two preceding loops, substantially as set forth.

I also claim the combination of the double headed looping hook with the shaft that imparts motion to it by means of two pins which are controlled by a cam the whole operating substantially as set forth.

I also claim the combination of the feeding instrument of the sewing machine with a shaft making one revolution to two descents by the needle carrier through the intervention of two cams of unequal projection, the whole operating substantially as set forth.

I also claim the combination of the feeding instrument with a shaft making one revolution to two descents by the needle carrier through the intervention of two cams and two adjustable wipers, one of said cams having two protuberances of equal projection, and the other having one protuberance of greater projection than those of the other cam, the whole operating substantially as set forth

46,304.—Table Cutlery.—Nathaniel Miles, Buckland, Mass., assignor to "Bay State Hardware Co.," Northampton, Mass.:

First, I claim in table and other cutlery the bolster, C D, formed separately from the tang and having the fastening part, D, narrower than the scale, B, and let into and concealed within the latter substantially as and for the purpose within set forth.

Second, I claim in connection with the above the employment of the hooks or additional parts, E E, adapted to lock the separate bolster pieces to the scales, B B, the whole being concealed within the latter substantially as within set forth.

46,305.—Metallic Window Sash.—Charles Neer, (assignor to the "Architectural Iron Works,") New York City:

I claim a sheet or rolled-metal window sash with sides, 1 2 3, flanged strips, 4, two part meeting rail, B', plug, 9, stiles, A A, and flanged strips or bars, c d, all substantially as herein shown and described.

46,306.—Machine for Washing Wool.—John Petrie Jr., and John Kenworthy, Lancaster, Eng., administrators of the estate of Samuel Taylor, deceased, assignors to Thomas Clegg, North Andover, Mass. Patented in England, July 8, 1853.

What is considered to be new, and therefore claimed as the invention of the said Petrie and Taylor, is the combination of a rotating or reciprocating plunger, c, one or more reciprocating beaters or agitators, e e,* and a rotating wheel or drum cylinder or frame, r armed with teeth, prongs or tines, the whole of such parts being applied to a trough and actuated by mechanical means substantially as described.

We also claim the combination of the rotating plunger, c, and the vibrating or reciprocating arms, e, for stirring, agitating and moving forward the wool in the trough.

We further claim in combination with the trough the endless apron, w, or its equivalent, and the squeezing rollers, the lifting drum or frame, r, above shown and described for raising the washed wool out of the water, and depositing it on the traveling endless band or other contrivance for conveying it to the squeezing rollers or some receptacle for receiving it.

We also claim the combination of the squeezing rollers, the lifting wheel, one or more stirrers or agitators, and the plunger, the whole being arranged and applied to a trough substantially as and to operate as specified; and also their combination with the vibrating frame, d, arranged in the trough as described.

46,307.—Spark Arrester.—August Prusman, Lingen, Hanover, assignor to Bernhard Schaffer and Christian Budenberg, New-York City:

I claim the arrangement of the inverted conical tube, F, cylindrical deflector, H, jacket, K, and water tank, I, in combination with the smokestack, E, jacket, C, and exhaust pipe, A, all constructed, applied and operating as and for the purpose herein set forth.

[This invention relates to an improvement in that class of spark arresters in which by a superincumbent tube the products of combustion are separated from the jet of steam and returned to the lower space of the spark arrester, without interfering with the free passage of the jet of steam or with the draught of the smoke stack.]

46,308.—Spark Arrester.—August Prusman, Lingen, Hanover, assignor to Bernard Schaffer and Christian Budenberg, New York City:

I claim a smokestack, A, for locomotives, expanding from the point, a, toward the top and bottom in about the proportion herein specified, and applied in combination with the exhaust pipe, B, in the manner and for the purpose described.

[The object of this invention is to increase the draught created by the action of the exhaust on the column of air in the smokestack o locomotives.]

46,309.—Mode of Compensation for Loss of Motion. Thomas Shaw (assignor to himself and Philip S. Justice), Philadelphia, Pa.:

I claim the combination of spring, k and m, crank wheel, d, and rod, f, when connected with the recording movement, n, in order to operate engine counters requiring a regular measured stroke, in the manner and for the purpose herein described.

46,310.—Paper Shirt Collars.—George K. Snow, Watertown, Mass., assignor to himself, March Brothers, Pierce & Co., Boston, Mass.:

I claim my improved manufacture of paper collar, that is one having on each of its two opposite sides indentations or imprints in imitation of stitching, the whole being substantially as and for the purpose specified.

46,311.—Machine for Making Metallic Tubes.—E. Valentine and M. T. Ridout (assignors to themselves and Wm. Beck), Milwaukee, Wis.:

We claim in combination with a movable mandrel, G, or its equivalent, the hinged sliding jaws, A A, pivoted upon a supporting block or table, B, and operating substantially in the manner and for the purpose herein set forth.

We claim, also, in combination with the jaws, A A, and movable mandrel, G, or its equivalent, securing said jaws by adjustable pivots so as to adapt them to mandrels of different proportions, substantially in the manner herein set forth.

46,312.—Fanning Mill.—Henry W. Veregge (assignor to Benjamin C. White, Marshall Henry, and William Cain, Jr.), Richmond, Ind.:

I claim hanging the slides or shutters of fanning or other similar mills to the frame, or to a piece connected to the frame, by means of a tongue, strip or block on said slides or shutters and a horizontal groove or grooves in the face of said frame or piece, as and for the purpose set forth.

46,313.—Ship's Galley.—William Young, Washington, D. C., assignor to himself, and Chas. F. Stansbury, Philadelphia, Pa.:

I claim, first, The combination and arrangement of the fireplaces, A' B' C' and D', and the oven, E', substantially in the manner and for the purpose specified.

Second, The arrangement and combination of the fireplaces, A' B' C' and D, with the oven, E', substantially in the manner and for the purpose described.

Third, The arrangement and construction of the fireplaces, A' B' C', oven, E', and side recesses, J K L and J' K' L', substantially in the manner set forth.

Fourth, The arrangement in a ship's galley of three or more fireplaces varying in capacity, substantially as and for the purpose described.

46,314.—Machines for Dressing and Finishing Threads, Etc.—Emanuel Burgy, Basle, Switzerland, and Louis Guillemin, Dieboldsheim, France:

We claim the combination of a winding frame, substantially such as herein described, with the bobbins, b, bath, e, wipers, g, and steamchests, h and i, all constructed and operating in the manner and for the purpose substantially as set forth.

[This invention relates to an apparatus which is applicable for the purpose of dressing, finishing, and imparting luster or gloss to all threads or filaments of silk, cotton, flax, and other fibrous substances, but more especially to yarn, thread, or filaments of waste silk or floss silk, which by the use of this apparatus can be rendered equal in appearance to silk, and thereby much enhanced in value.]

46,315.—Hydraulic Apparatus.—Auguste Desgroffe and Achille Ollivier, Paris, France:

We claim the employment or use of a rope, h, or its equivalent, in combination with a box, A, provided with one or more plungers or movable sides, or made of some expansible material, substantially as and for the purposes set forth.

[This invention consists in gradually introducing into a water-tight vessel or box, which is filled with water or other non-compressible liquid and provided with one or more movable sides or fixtures or made expansible, a cord or rope in such a manner that by said rope the liquid in the box, or a portion of the same, is displaced and a powerful pressure is exerted on the sides of the box, which, when movable or expansible, transmit the power thus exerted on their inner surfaces to bodies placed against their outer surfaces, and a powerful pressure can be exerted with comparatively little power and with an apparatus of a simple and cheap construction.]

46,316.—Mode of regulating Motion of Railroad Car Trucks.—Charles Schoubersgky, St. Petersburg, Russia:

I claim the fly-wheels, A A, connected to an axle, B, and supported by the peripheries of the driving wheels of a truck, with or without intermediate friction wheels, substantially as and for the purpose set forth.

[This invention consists in the employment or use of two heavy fly-wheels secured to the ends of an axle which rests, either directly or indirectly, upon the driving wheels of a truck in such a manner that by the action of said fly-wheels the velocity of the truck is rendered uniform and the momentum stored up in said fly-wheels when the truck is going down hill will revert to the locomotive in drawing a train up on an incline.]

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RE-ISSUES.

1,861.—Cartridge Box.—Erastus Blakeslee, New Haven, Conn. Patented Dec. 20, 1864 :

I claim a cartridge box constructed in the manner described, to carry one or more movable tubes, each tube containing two or more cartridges, as and for the purpose specified.

1,862.—Supplemental Valves for Steam Engines.—Richard Colburn and L. W. Hanson, Norwich, Conn. Patented May 20. 1856 :

We claim as our invention the combination of an apparatus, substantially as described and for the purposes specified, with the cylinder and piston of a steam engine—such apparatus consisting of the passages, f g, the valve boxes, E E', the valves, K K', their seat passages, h h', and the lever, L', or its equivalent.

We also claim the said apparatus constructed substantially as described and for the purpose or purposes specified.

1,863.—Valve Gear.—Joseph F. Hamilton, Pittsburgh, Pa. Patented July 14, 1863 :

I claim the arrangement of the regulating coupling arms, h, lifters or propeller arms, j k, springs, l, levers, m and n, and link, d, when used in connection with a governor, rock shaft or eccentric of steam engines, the whole being constructed and operating substantially as herein described and for the purpose set forth.

1,864.—Arrangement of Valves for Steam Engines.—Joseph F. Hamilton, Pittsburgh, Pa. Patented July 24, 1860 :

I claim the use of the valve, i, placed in one of the receiving ports of steam engines, as herein described, and for the purpose set forth.

1,855.—Carding Machines.—Lawrence O'Brien, Indianapolis, Ind. Patented Oct. 6, 1863 :

I claim the arrangement of the roll, D, between the main card cylinder, A, and the endless apron, C, substantially as and for the purpose set forth.

Also the construction of the endless apron, C, substantially as herein described, so as to carry the fibers on top of the slats, and dust and other foreign matters between them, the fibers being delivered to the roll, D, and the foreign matters discharged in passing over the upper roll, F, when the same is applied in the manner specified.

1,866.—Keyed Instrument of Music.—Francis Peabody, Salem, Mass.—Patented Nov. 10, 1863 :

I claim as my improvement in mechanism for operating the sound-producing parts of a musical instrument the above-described arrangement of dents, or their equivalents, on a rotary plate, G, viz., in concentric circles, and with the circle of treble and bass dents alternating with respect to one another, substantially as set forth.

And in combination with the said arrangement of dents on a rotary plate, I claim the arrangement of the bass and the treble-key levers, or the parts which produce or aid in producing the musical sounds, in two separate series or sets, whereby those of the bass notes are in one set and those of the treble notes are in the other set, substantially as specified.

And in combination with the keys of a keyed musical instrument, I claim a series of operative key levers and a rotary plate, provided with dents, arranged on its face, as specified.

I also claim the combination of the separate operating wheel, D, and its operative mechanism, substantially as described, with the plate, G, provided with dents, or their mechanical equivalents, arranged as explained.

I also claim the combination of the hinged or elevating frame, M, with the plate, G, and the series of operating levers, C C', or their equivalents.

I also claim the improved speed regulator, composed of one or more adjustable wings, N N', and their stationary surface or wing or wings, and mechanism for varying the position of the adjustable wing or wings relatively to one or more stationary wings, substantially as and for the purpose specified.

I also claim a combination, consisting of the rotary plate, G, with its arrangement of dents, the series of key levers, C C', or their mechanical equivalents, and a mechanism for imparting a rotary motion to the plate, G, the said key levers being applied to the keys and to the dents, by means, and so as to operate therewith, substantially as specified.

1,867.—Paper Collars.—Wm. E. Lockwood, Philadelphia, Pa., assignee by mesne assignment of Walter Hunt. Ante-dated July 24, 1854 :

As a new manufacture, a shirt collar, in which paper is used to imitate starched linen, and which is made of the desired shape by dies or forms applied under pressure.

DESIGNS.

2,028.—Military Belt Hook.—Erastus Blakeslee, New Haven, Conn.

2,029.—Badge or Breastpin.—Michael F. Ryan, New York City.

2,030.—Trade Mark.—Stephen S. Winchester (assignor to E. A. & W. Winchester), Boston, Mass.

PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if alike invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATTENS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does no limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO's Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the mode is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Notes and Queries

S. J. A., of Vt.—No power is actually gained by either the lever, inclined plane, screw or wedge; what is gained in power is lost in time. This applies to them all equally.

O. M., of Ind.—You have doubtless seen that the true inventor of the Ruhmkorff coil has already been named in our paper.

D. B., of Wis.—The "natural lime" in soil is carbonate of lime, and this would not injure guano. Sulphuric acid, if mixed with guano, would combine with the ammonia to form sulphate of ammonia, and then this would be slowly decomposed during the growth of the plants, yielding the ammonia as it was wanted. Sulphuric acid is destructive to both animal and vegetable compounds, and would require diluting with many times its weight of water to be harmless to vegetation. It is not a fertilizer

C. T., of Mass.—We know of no method by which you can mix elaine oil with water.

J. W. P., of Me.—A sand bath for bluing steel is simply white beach sand, such as is used for scrubbing floors. Place it in an iron pan, over the fire, and heat it hot. The steel must be polished bright, and laid on the sand, when it will gradually acquire a bluish tint. At the right shade take it off and plunge it immediately in cold water. Anything that diffuses the heat evenly will do as well as sand; this material is only used for that purpose.

J. M., of N. Y.—Ede, on steel working, is the book you want. Address D. Appleton & Co., New York City, or go there for it.

G. F., of Mass.—The sample of paper you send is made of cotton.

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M. S., of N. Y.—You should use a rotary horse-power, not a treadmill. You will require two horses instead of one.

J. L. H., of Bay City.—You can line up your propeller shaft by taking out the piston and stretching a line through the center of the cylinder, past the crank pin. Turn the crank on each center alternately. If the center of the crank-pin journal coincides with the center of the cylinder the shaft is right. If either end is out, the extreme end of the shaft must be moved to correct it. We cannot give you the information you ask in the space at our disposal.

J. P. S., of Pa.—We do not know the makers of the steam calliope. It was advertised in the SCIENTIFIC AMERICAN many years ago.

H. C. P., of Ill.—The wooden blacking boxes are made by Horace Thayer, No. 36 Beekman street, New York.

C. E. T., of N. Y.—Mercury in expanding will move a piston with a force practically irresistible. All chemical action depends very much upon temperature.

J. G. R., of Nebraska.—You will find tables of the comparative heating powers of various woods in back numbers of the SCIENTIFIC AMERICAN. They have been published many times. H. C. Baird, No. 406 Walnut street, Philadelphia, will furnish you with a work on grinding grain.

Americus.—Machinery for extracting oil from the Palma Christi nut can be had of J. H. Woodgate, No. 182 Greenwich street, New York.

G. W. H., of U. S. N.—We do not know the precise date of the burning of the *Knoxville*. It was about four or six years ago. She had an oscillating engine, built at the Novelty Iron Works.

W. P. B., of Wis.—You could readily make your candle tips as you propose. Whether a patent would pay is for you to determine. Your loss certainly could not be great.

H. D., of Ohio.—We do not believe that there is anything poisonous in the corn cob.

J. M., of Pa.—We do not understand what you mean by removing the coloring property of white lead. It has the power of coloring only white, and this can be destroyed by decomposing the salt.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 1, to Wednesday, February 8, 1865:—

E. S. M., of N. Y., $12; I. B., of N. Y., $25; O. E. M., of N. Y., $25; J. F. W., of N. Y., $25; J. N. S., of N. Y., $22; W. V. McK., of N Y., $25; Van H. & A., of N. Y., $25; J. M. C., of N. Y., $25; F. & B., of N. Y., $25; R. S., of N. Y., $40; S. E. S., of N. Y., $40; C. H. S., of Me., $45; J. N., of Mass., $20; S. & B., of Ill., $20; J. W. B., of N. Y., $22; A. T., of N. Y., $15; J. W. S., of Mass., $20; G. [J. B., of Iowa, $45; D. K., of Pa., $45; T. G. O., of N. Y., $20; A. S., of Mo., $40; J. S. G., of Pa., $40; B. O., of N. Y., $15; L. R., of Pa., $41; G W. B., of N. Y., $15; W. W., of N. J., $20; D. & Z., of Ill., $20; P. J. G., of N. Y., $20; H. A., of Pa., $20; E. M. M., of Mass., $40; J. F., of Mich., $45; A. & B., of N. Y., $20; C. S., of Germany, $20; W. G W. J., of Md., $110; L. A., of Conn., $75; M. K., of N. Y., $15; C. Van H., of N. Y., $10; F. N., of N. Y., $45; D. A. D., of N. Y., $15; E. C., of Me., $20; V. F., of Mass., $20; W. H. L., of N. Y., $15; A K., of N. Y., $15; J. P. H., of N. Y., $15; E. A. P., of Pa., $25; J. R. E., of U. S. N., $20; J. C., of N. Y., $15; E. H. C., of N. Y., $20; W. B. P., of Pa., $20; J. G., of England, $45; N. E. B., of N. Y., $15; W. H. P., of N. Y., $15; J. W. C., of N. Y., $15; C. B., of N. Y., $40; M. P., of N. H., $20; J. & N. W. R., of Mass., $20; J. D. H., of Pa., $10; F. R., of Mich., $16; G. W. B., of Conn., $25; W. B. W., of Mass., $15; F. B., of Iowa, $20; C. A. L., of Pa., $15; J. G. I., of Ill., $36; L. H. L., of N. Y., $25; W. R., of Ill., $15; J. L. & S. L. O., of Mass., $30; T. K. A., of Ill., $20; J. S., of Conn., $15; E. P. A., of Conn., $15; S. & P., of Ill., $30; H. E. S., of Wis., $15; C. F. H., of Pa., $16; G. M., Jr., of Ill., $16; D. & H., of Ind., $15; A. H. P., of Kansas, $35; N. G., of Wis., $25; J. B. H., of N Y., $50; J. R., of Mich., $100; M. J., of Pa., $25: H. & N., of Mo., $16; P. & Y., of Ill., $25; A. L. D., of Mass., $16; J. T., of Pa., $15; P. J. C., of Conn., $41; A. W., of Me., $30; S. C., of N. Y., $15; C. B. G., of Iowa, $41; L. M. G., of N. Y., $15; H. A. F., of Mich., $16; G. A., of Mich., $100; W. H. D., of Ind., $15; E. J. T., of Iowa, $15; H. K., of Iowa, $15; P. B., of N. Y., $25; M. B. W., of Ky., $25; LeR. S. S., of Mass., $75; B. F., of Ill., $16; J. P. B., of Me., $25; B. & B., of Mich., $16; H. H. of Iowa., $25; W. & H., of Ill., $25; M. & H., of Ill., $12; N. F. G., of Conn., $15; R. McD., of Ill., $35; A. W. L., of Ohio, $20; J. H., of Va., $16; M. B., of Conn., $25; J. L. G., of Mass., $25; W. K., of Ill., $15; H. P. A., of Ohio, $25; S. & P., of Mass., $16; W. & C., of N. J., $15; J. R C., of N. Y., $15; P. S. C., of N. Y., $16; H. W. B., of N. Y., $16; E. F., of Pa., $16.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to

parties with the following initials have been forwarded to the Patent Office, from Wednesday, Feb. 1, to Wednesday, Feb. 8, 1865:—

E. S. M., of N. Y.; J. B., of N. Y.; E. E. M., of N. Y.; J. F. W., of N. Y.; H. B., of N. Y.; W. E. R., of N. Y.; W. V. McK., of N. Y.; Van H. & A., of N. Y.; J. M. C., of N. Y.; F. & B., of N. Y.; J. E. M., of Ohio; R. S., of N. Y.; L. E. P., of N. Y.; J W. B., of N. Y.; A. S., of Mo.; J. S. G., of Pa.; L. R., of Pa.; E. M. M., of Mass.; W. G. W., Jr., of Md.; L. A., of Conn., 2 cases; C. B., of N. Y.; C. B. G., of Iowa; I. N. S., of N. Y.; N. G., of Wis.; P. & Y., of Ill.; M. J., of Pa.; J. K., of Conn., 2 cases; L. H. L., of N. Y.; F. B., of Iowa; H. H., of Iowa; W. & H., of Ill.; A. W., of Me.; J. R., of Mich.; H. K., of Iowa; M. R. W., of Ky.; Le R. S. S., of Mass., 3 cases; R. H. & J., of R. I.; T. M., of Ill.; J. P. B., of Me.; J. L. G., of Mass.; C. B. G., of Iowa; E. B. L., of Conn.; P. B., of N. Y.; G. W. B., of Conn.; C. B. R., of Conn., 2 cases; D. H., of N. Y.; M. B., of Conn.; H. P. A., of Ohio; H. L. B., of Pa.; L. S., of Pa.; H. R. A., of Ill.; J. L. & S. L. N., of Conn.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our receipt on of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Back Numbers and Volumes of the "Scientific American."

VOLUME IV., AND VOLUME XI., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VII., VIII., IX. and X., are out of print and cannot be supplied.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

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By mail, free of postage.

SYNOPTICAL INDEX.

HIGH-PRESSURE ENGINE—Cylinder; Cross Head or Connecting Pin; Connecting Rod; Crank and Shaft; Designing; Eccentric; Eccentric Rod, Band and Bolts; Fly Wheel; Feed Pump; Feed Pump, Relief Valve; Guide Block; Governor; Horse Power (Nominal); Main Framing; Power; Power (Actual); Piston; Piston Rod; Stuffing Box and Gland; Steam Port (Supply); Slide Valve; Slide Casing.

BEAM ENGINE (CONDENSING)—Beam; Beam, Wrought Iron; Cylinder, Thickness; Crank, Cast Iron; Crank Shaft; Crank, Wrought Iron; Condenser; Eccentric Rod; Fly Wheel; Gear for Working Slide Valve; Pumps, Air and Feed; Parallel Motion; Ports; Power.

MARINE SCREW ENGINES—Air Pumps; Air-pump Piston; Banjo Frame; Cylinder; Condenser; Connecting Rod; Connecting Rod, Single Ends; Crank and Shaft; Casing (Valve); Common Slide Valve; Common Slide; Common Equilibrium Slide; Coupling, Wrought Iron; Donkey Engine; Exhaust Steam Pipe; Eccentric Rods, Bands and Bolts; Exhaust Relief Slide Valve; Exhaust Relief Equilibrium Slide Valve; Equilibrium Slide Valve; Frame, Banjo, for Large Engines; Feed Pump; Frame, Main; Frame, Banjo, for Small Engines; Guide Blocks; Guide Block, Common; Guide Frame; Griffith's Screw Propeller, Proportions of; Injection Valve; Injection Area; Power, Nominal; Piston; Piston Rod, and Stuffing Box; Power for Screw Propeller; Slide Valve Link Motion; Solid Link; Screw Propeller; Screw Propeller, Pitch of; Screw Propeller, Griffith's Patent; Stern Bracket; Surface Condensation; Stern Tube and Stuffing Box; Thrust Block and Screw Shaft; Turning Gear and Coupling; Twin Screw Propulsion; Valves, for Air Pump; Valve Seating; Valves, Arrangement of.

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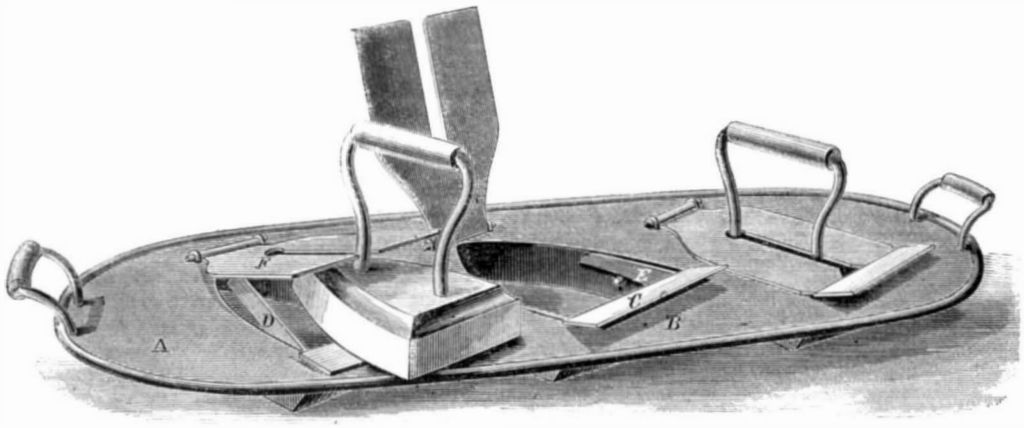
Improved Sadiron Heater.

This simple utensil is intended to facilitate heating sadirons and economize coal, both of which are perfectly attained by it. Heating irons on the stove or range is a very expensive practice, for a great fire has to be kept up, and a large proportion of the heat is radiated. In summer time this is particularly objectionable, for the fuel is not only wasted but the apartment is rendered exceedingly uncomfortable. The heater shown herewith is a capital thing for the purpose and should be found in every family. The heater sits in the stove, as usual, and has recesses or pockets, A, in which the irons are placed. These recesses are covered so that the iron is really in a pocket, exposed to the heat, but protected from



BLEYER'S SADIRON HEATER.

the air. The handles are also kept cool, or at least at a much lower temperature than when this heater is not used. The pockets can be removed separately when burned out, provision being made for that object.

By looking on the engraving at B, a metallic plate, C, will be observed. When the iron is to be entered, this plate tips up, as shown at D; the iron being set on it throws the back arms, E, up, as shown in the figure of the iron, thus raising the cover, F, and allowing the iron to be put in place. By merely setting the iron on the plate, C, therefore, the cover opens and the iron may be put in the recess without using any instrument or lifter to raise the covers. This ingenious device cannot get out of order, and is so simple that the most stupid servant cannot misunderstand it. It was patented through the Scientific American Patent Agency, on the 18th of Oct., 1864, by Henry W. Bleyer; for further information address him at 380 Michigan street, Buffalo, N. Y.

Meteoric Rain.

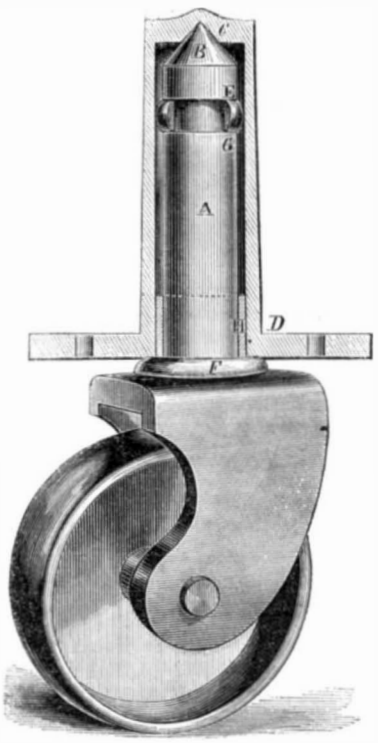
The Paris correspondent of the *Chemical News* states that a curious experiment has been made by Dr. Reichenbach, of Vienna. He believes in the existence of a cosmical powder or dust which exists all through space, and which sometimes becomes agglomerated so as to form large and small meteorites, while, at other times, it reaches the surface of our earth in the form of impalpable powder. We know that meteorites are mainly composed of nickel, cobalt, iron, phosphorus, etc. Dr. Reichenbach went to the top of a mountain which had never been touched by spade or pickax, and collected there some dust, which he analyzed, and found it to contain nickel, and cobalt, and phosphorus, and magnesia. People have wondered where the minute quantity of phosphorus so generally distributed on the surface of the earth came from. The doctor, however, has discovered it in this mysterious invisible rain, which henceforth must be looked upon as quite as necessary for vegetation as the water which falls from the clouds.

Still Thinner Iron.

The *Birmingham Daily Post* says: "The 'thinnest sheet of iron yet rolled in the world,' has elicited numerous competitors in this country, and has at last been signally beaten. The sheet in question was the 1,000th part of an inch in thickness. The other day we mentioned that iron had been rolled at Cardiff considerably thinner, and since then some iron still thinner, rolled by Messrs. James, of Bilston, has been shown to us by Mr. Brinton, of Great Charles-street, in this town. Yesterday two other samples came to hand. One of them, rolled from common iron in the ordinary sheet mills, by Messrs. Robert Williams and Co, of Swan Village, Westbromwich, is 1,015th part of an inch thick, is very tough, and has a very good even surface. The other specimen, which at present bears away the palm, consists of two sheets, measuring 8in. by 5½in., weighing respectively 49 and 49½ grains, and being the 1,400th part of an inch in thickness! These marvellous examples of iron rolling were produced by Messrs. Nevill, Everitt, and Co., of the Marshfield Ironworks, Llanelly. The Messes. Everitt, of Kingston Works, in this town, are partners in this firm; and therefore, a Birmingham house may finally claim the credit at first taken by our ironworker at Pittsburg, the Birmingham of the United States. It should be added that one of the specimens sent us by Messrs. Nevill and Everitt, is beautifully finished; the other is left just as it came from the rolls, not having been annealed."

RILEY'S CASTER.

The object of this invention is to procure a strong, durable and easy-working caster for pianos, chairs, tables, and other furniture. It resists any lateral strain to which it may be subjected in moving the furniture, and at the same time conforms easily to the direction in which the table or chair is to be moved.



The engraving published herewith is a section of the tube and an elevation of the roller; the section shows the details of the improved portion. The shank, A, of the caster has a pointed end, B, which fits in a center, C, in the tube or socket, D. This center sustains the weight of the piece of furniture, and the collar, E, below, has little or no friction upon it, thus allowing the roller to conform to any direction with great facility. The upper part of the shank has a recess, F, in it which carries a spring, G; this spring is larger than the tube and collapses or closes when the shank is pushed on to its place, thus while the shank can revolve in the tube it will not slip out when the article to which it is secured is lifted off the floor. There is in addition a loose collar, H, which steadies the lower portion of the shank and renders it at all times easy working. The caster proper may be pulled out of its socket and oiled, if necessary, in a moment, and reinserted when necessary. In other respects this is a strong and well made caster, and one likely to give good satisfaction. A patent was procured on it through the Scientific American Patent Agency, on the 25th of November, 1864, by J. M. Riley, of Newark, N. J. For further information address Riley & Smith, No. 30 North Broad street, Newark, N. J.

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